UNIVERSITY OF GOTHENBURG
SCHOOL OF BUSINESS, ECONOMICS AND LAW

The optimality of EMU

– A comparative study

BACHELOR THESIS
DEPARTMENT OF ECONOMICS

Sofia Dahlqvist & Sannah Flood

Supervisor: Bo Sandelin

Spring 2013

Abstract

The aim of this macroeconomic study is to evaluate whether the Economic and Monetary Union (EMU) has become an optimum currency area (OCA) or not. To reach a conclusion about the optimality of EMU we have performed two analyses where the first one evaluates the potential impacts of an expansionary monetary policy in Germany, France, Greece and Cyprus. The second analysis compares the properties of the early OCA theory with the characteristics of EMU. Our findings suggests that the EMU is far from complete since the theoretical properties are not fully met in terms of, *inter alia*, labor mobility and fiscal and political integration. The result of the first part of the analysis also supports this conclusion since it proclaims that one size of monetary policy does not fit the current needs of all member countries. We can conclude that EMU has met several obstacles and for the EMU to be able to manage challenges ahead it needs to enhance the properties in order to become an OCA.

Key words:

Optimum Currency Area (OCA), European Central Bank (ECB), Economic and Monetary Union (EMU), Europe, Euro, Eurozone, expansionary monetary policy, the GG-LL model, transmission mechanism

Acronyms

1. BOP - Balance of Payments
2. ECSC - European Coal and Steel Community
3. ECU - European Currency Unit
4. EEC - European Economic Community
5. ERM - Exchange Rate Mechanism
6. EMS - European Monetary System
7. EMU – Economic and Monetary Union
8. EU - European Union
9. EURATOM - European Atomic Energy Community
10. EU25 - Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Lithuania, Luxembourg, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom
11. EZ - Eurozone
12. HICP - Harmonized Index of Consumer Prices
13. NCB - National Central Bank
14. NII - National Income Identity
15. OCA - Optimum Currency Area
16. SEA - Single European Act
17. SGP - Stability and Growth Pact

Table of contents

1. Introduction

1.1 Outline

The first chapter is an introductory chapter where we present the background of the EMU, a problem discussion and the purpose and limitations of the study. The aim of this chapter is to introduce the reader to the topic and provide the reader with sufficient information to understand the following chapters.

The second chapter clarifies the methodology of the study and highlights the critical approach towards our method. The intention of this chapter is to illustrate the structure of the paper so as to clarify our line of thought throughout the paper which facilitates the understanding of the results.

The third chapter contains the theory where we display the criterions of an OCA, the story of EMU and the functioning of the ECB. The aim is to create a solid theoretical foundation for the upcoming analysis in the fourth chapter.

The analysis is divided into two parts, the first part will examine the effects of an expansionary monetary policy and the second part will provide a comparison between the early properties of OCA and the characteristics of EMU. The last, and fifth, chapter will provide a conclusion that answers the purpose of this study and it will also suggest future studies within this topic.

1.2 Background

As a result of the two world wars in the 20th century and to guarantee that these experiences would not be repeated, European leaders agreed that economic integration and cooperation would be the best solution. From this period and onward there have been several preparations for, and attempts towards, the final goal of a unified market − that is the EMU.

In 1944, the signing of the Bretton Woods agreements took place. These agreements led to a foundation of the world economy and the establishment of what is now known as the World Bank and the International Monetary Fund (IMF). Moreover, the Bretton Woods agreements provided an international framework for exchange rate stability with gold and the USD as the monetary standard.

After the Second World War, the foundations of what would later become the European Union (EU) were signed through three treaties. The first treaty, the treaty of Paris, established the European Coal and Steel Community (ECSC) in 1951, where it proclaimed free trade of coal and steel between the signing parties Germany, France, Italy and the Benelux countries (the original six). The second and third treaties, also called the treaties of Rome, established the European Economic Community (EEC) and the European Atomic Energy Community (EURATOM) in 1957. The authors of the treaty of Rome accounted for stable exchange rates and that Europe

could be securely constructed through a customs union and a common market allowing for free movements of people, capital, goods and services (European Commission, 2006:4 & EU, 2011).

Later, the Werner report was written and it aimed to explain how EMU could be achieved within a ten-year period. The final report involved a three-stage process for attaining EMU and the cornerstones of the report were free capital movement, permanent fixed exchange rates and possibly a single common currency (European Commission, 2006:4-5).

The response was a new proposal of EMU that later, in 1979, was established in a more limited form as the European Monetary System (EMS). The European Currency Unit (ECU) was introduced as a basket currency weighted against the average of the EMS currencies and the Exchange Rate Mechanism (ERM) was implemented. Each member's currency was then controlled and kept within a ± 2.25% band from the central rates and the system thus worked as a fixed but adjustable exchange rate system (Salvatore, 2007:733-735).

The expansion of the EEC membership was followed by a period of considerable stagnation. There were problems raised by the oil crisis during the 1980s and the collapse of the Bretton Woods system led to a wave of instability of the international monetary system. During this period the EEC modified the treaties of Rome with the Single European Act (SEA) which implied a reform of institutions and the removal of all remaining barriers to provide free trade among the members (Salvatore, 2007:352 & McDonald & Dearden, 2005:9).

In 1989, the Delors report submitted a three-stage process towards EMU. It proposed, besides a single common currency (the euro) and an independent central bank (the European Central Bank), a completion of the internal market through the introduction of free capital movement. To proceed with these stages, the European Council signed the treaty of the European Union (the Maastricht treaty) in 1992. The Maastricht treaty consisted of convergence criteria that a possible EMU member needs to fulfill and the treaty also trusted the European Central Bank (ECB) with the goal of retaining price stability. ECB is almost entirely independent of political influences so as to shield it from being forced to a certain monetary policy which in turn may lead to inflation (European Commission, 2006:7-8).

By 1997, a pact referred to the Stability and Growth pact (SGP) was negotiated to ensure fiscal discipline among EMU members. The pact requires member countries to have budget deficits smaller than 3% of GDP and public debts that did not exceed 60% of GDP (Salvatore, 2007:737 & Europeiska Kommissionen, 2012).

The first of January 1999, the euro was introduced by 11 countries who were members of the EU. The adoption of the euro resulted in a fixed exchange rate between all member countries of the EMU and a single flexible exchange rate *vís a vís* other foreign currencies (Krugman et al. 2012:587). Today 17 countries share the single currency that has become an international currency second to the USD.

1.3 Problem discussion

The theory of an OCA involves a common currency and thus a loss of ability for member countries to influence their monetary policy. In theory, a common currency implies increased integration which would result in increased symmetry between member countries.

At the beginning of the EMU some believed that such a composition would shatter the relationships between countries, while some were more optimistic and believed that the composition could become an OCA. Since the introduction of the euro, economic and financial integration between the member countries have increased which has implied an allocation of capital from surplus countries to deficit countries. However, the EMU has met several economic disturbances along the way and it is not necessarily as successful as one might thought it would have been since its beginning.

Based on the above discussion, one might ask oneself if the member countries have enough flexibility to absorb shocks without an independent currency policy or a monetary policy. Furthermore, one might also wonder what would happen if the transmission mechanism of monetary policy in fact has different effects on different countries which brings us to the question; does one size of monetary policy really fit the needs of all member countries?

1.4 Purpose of the study

The purpose of this paper is to analyze whether the EMU has become an OCA or not. If not, we will try to investigate for which type of country it may be more or less beneficial. To reach a conclusion about this topic we will study the underlying theory of an OCA and use the transmission mechanism of expansionary monetary policy conducted by the ECB.

The main questions that are used to answer the purpose are:

- How does the EMU meet the requirements for an OCA?
- How does an expansionary monetary policy conducted by the ECB affect the member countries of the union in terms of small countries in crisis and larger countries?
- In the case of such policies, which countries benefit more or less compared to others?

1.5 Limitations

We base our theory on the concept of an OCA founded by Mundell (1961) where we only consider these properties and do not apply the later and more developed properties of the OCA theory, i.e. the META properties.

This study focuses on the optimality of the EZ and we will therefore not take into account member countries of the EU since they have not adopted the euro. In the analysis, only four countries, Germany, France, Greece and Cyprus, are defined and evaluated in terms of an expansionary monetary policy. We assume these countries to be representative within each category, i.e. small countries in crisis and large countries.

We only focus on the expansionary monetary policy since the EZ is experiencing a recession and this is thus the policy that is currently pursued by the ECB. This policy is shared by the countries and no consideration has therefore been taken to the national ability to influence conditions through the conduction of fiscal policy.

When performing the analysis we evaluate policy effects based on the current situation and we do not take into account the possible effects of previous monetary policies that may have shaped the current situation within the EZ, or how the policies may have been conducted if the EZ instead were experiencing an economic boom, i.e. a contractionary monetary policy. Furthermore, the analysis is only based on four factors, real GDP growth, inflation, unemployment and trade balance, whom all are affected by the outcome of monetary policy. We focus on these factors because they represent important and relevant components in the evaluation of a sustainable economy. Other factors that may affect the outcome and the functioning of a monetary union, such as factors of political nature, falls beyond the scope of this report and they will only be mentioned but not analyzed any further.

2. Method

2.1 Choice of method

To perform this macroeconomic study we have used secondary data in the forms of textbooks, websites, databases and articles. We have also used our prior knowledge about the subject. A selective method is used when choosing sources. We have attempted to find the original source of information but also choose sources that are the most recent. The sources are also well-known since they are mentioned in other studies, textbooks and stem from large institutions hence we have tried to be as critical of sources as possible.

The methods that are used as the basis for interpretation and analysis are derived from the knowledge based on the theory of OCAs founded by Mundell during the 1960s. The following analysis consists of two parts.

In the first part we will use a theoretical approach based on the transmission mechanism of monetary policy to evaluate possible impacts of an implementation of an expansionary monetary policy in predetermined countries. These predetermined countries intends to represent the categories of small countries in crisis and larger countries, we have chosen Greece and Cyprus to represent the category of small countries in crisis and Germany and France to represent larger countries. The comparison is based on the current situation in each of the four countries. We evaluate the effects of an expansionary monetary policy by investigating real GDP growth, inflation, unemployment and trade balance. The data concerning this part are obtained mainly from Eurostat and consolidated in Excel.

In the second part of the analysis we will compare the early properties of OCA theory with the characteristics of the EMU and evaluate if these are alike. The comparisons between these properties and countries underlies the determination whether the EMU and its policy is suitable with the properties of the OCA theory or only favors one type of country.

An alternative method to our study could be to perform an econometric analysis through multiple regressions using primary data. Such analysis would investigate if the chosen variables have significant differences before and after the implementation of a certain policy. Other similar methods may also be considered as alternatives.

2.2 Critical review of the method

In our study we have chosen both articles and textbooks as sources. One critical view is that the textbooks take longer time than articles to complete which creates the risk of being out of date. However, sources like Mundell (1961 & 1997) and McKinnon (2002) among others whom wrote the foundation of the OCA theory still remain relevant. It is also essential to keep in mind that studies that are used in our analysis bears the risk of not being the most recent and reliable to apply in the current situation of the EMU since the circumstances may have changed. We believe that we have taken this risk into account.

There is also a critical approach towards our analysis. The first part of the analysis only examines four factors that may be affected by an expansionary monetary policy. Such a limited examination makes it hard to distinguish the potential effects of the policy since there are other factors influencing the outcome. Moreover, the effects of the policy are only applied on four predetermined countries and in general it is hard to distribute these countries within different categories and make them representative for other similar countries within the EZ.

The second part of the analysis compares the early properties of OCA to the characteristics of the EMU, a critique towards this comparison would thus be that one might want to use the later and more developed properties of OCA, i.e. the META properties. Furthermore, we only scratch the surface of these properties which makes it even harder to reach a conclusion about the optimality of the EMU since considerably more data could have been collected.

3. Theory

3.1 Optimum Currency Areas

3.1.1 The theory of an optimum currency area

The theory of an OCA was introduced by Mundell and McKinnon among others during the 1960s, although some insights were brought up earlier by Friedman and Meade during the 1950s. An OCA can be defined as an optimal area of sovereign countries whose exchange rates are irrevocably pegged against a single currency where the single currency fluctuates jointly against other currencies. A country's adoption of the single currency is expected if the benefits of adopting exceed its costs. The domain of an OCA is determined by the boarders of those countries whom decide to adopt the single currency (Mongelli, 2002:7).

Optimality is defined in terms of several OCA properties where these properties constitute the early theory of OCA and by sharing these properties member countries of a currency union reduces the usefulness of the nominal exchange rate as an instrument. The first and second property, also the two main properties presented by Mundell (1961), are the *property of wage and price flexibility* and the *property of labor and factor mobility*. Referring to Mundell (1961:657, 664) a flexible exchange rate regime is said to be redundant if labor, capital and other factors are mobile across national boundaries.

The third property refers to *financial integration* where a high degree of financial integration is found to reduce the need of exchange rate adjustments. It appears that countries who suffer from asymmetric shocks can share a currency if they insure each other through financial markets. A fourth property states that a higher degree of *economic openness* would result in less usefulness of the nominal exchange rate as an adjustment instrument due to the fact that international prices are more likely to be transmitted into domestic costs of living through tradable goods and services. The nominal exchange rate is also less useful for diversified countries because *diversification in production and consumption* dilutes the possible impacts of shocks to any sector and this is also true for countries with *similar inflation rates* in the medium run. It is noted that if inflation rates between countries are similar and stable over time, so is also the case for terms of trade.

Another property refers to *fiscal integration* where an advanced political integration is needed to allow transfers to member countries that have been affected by an adverse asymmetric shock. This scenario also involves a willingness of all member countries to undertake such a risky commitment. The final property, and probably one of the most important of the above mentioned properties, concerns *political integration*. It is relevant that member countries share similar policy attitudes since political integration facilitates joint commitments, maintains various economic policies and encourages institutional linkages (Mongelli, 2008:2-3).

The properties of the early OCA theory have been discussed and weaknesses of these properties have been debated. One main problem, also referred to as the *inconclusiveness* problem, was that the optimality attributes necessarily did not point in the same direction. For example, an open economy (with preferably a pegged exchange rate or a single currency) could at the same time have a low factor mobility or labor mobility which proclaims a flexible exchange rate. This problem has its roots from the fact that several properties are difficult to measure unambiguously.

Another main problem is the problem of *inconsistency* which implies, in the words of Mongelli (2008:4), that "small economies, which are generally more open, should preferably adopt a fixed exchange rate [...]. However, the same small economies are more likely to be less differentiated in production than larger ones. In this case they would be better candidates for flexible exchange rates according to the diversification in production property". Finally, it was also pointed out that the evaluation of the properties is rather difficult due to their dependence on one another (Tavlas, 1994:213-214).

3.1.2 The decision between joining and not joining a currency area[1]

McKinnon (2002:360-361) states that there are only two reasons why a country should not be a part of a common currency area or a common monetary standard, like the Bretton Woods system. The first case indicates that a country should not join if its public finances are too weak. Under a fixed exchange rate regime, there is no possibility to use inflation to reduce real public debt. Furthermore, by joining, the national central bank (NCB) disclaims its right as a "lender of last resort" and as the preferred borrower in the national capital markets. Secondly, "no sufficiently stable monetary standard exists in the rest of the world. Natural trading partners, by the OCA criteria, are themselves not stable in a monetary sense" (2002:361).

Mundell (1997) also lists some circumstances when a country should decide not to join a currency area or a fixed exchange rate area. However, he also takes into account the circumstances when a country should decide to join. A case against joining would for instance be if the country in question:

- does not share the same inflation target as the area,
- wishes to use the exchange rate as a an instrument, i.e. maintain its monetary independence, or

[1] In appendix 2 the GG-LL model is presented in detail and it describes the benefits and costs of joining a currency area.

- as a larger country, does not want other countries to benefit from its economies of scale or provide aid to other countries within the area which would be an essential part of the agreement.

On the contrary, a case in favor of joining a currency area would be if the country:

- shares the same inflation target as the area,
- would like to create an anchor for policy and establish an automatic mechanism of fiscal and monetary policy, or
- would like to be a part of an economic bloc which implies a dominant authority against neighboring powers.

3.1.3 More in detail - The benefits and costs of joining a currency area

The benefits of the OCA theory arise with the benefits of a common currency. There are direct and indirect gains from eliminating the costs of exchanging from one currency to another, a direct gain implies that there is no additional cost when for instance exchanging or transferring money between EMU members. An indirect gain, on the other hand, could be more price transparency, i.e. consumers can overview and compare prices easier when prices are set in the same currency unit.

A common currency implies permanent fixed exchange rates between member countries which makes the area more likely to experience greater price stability. Greater price stability discourages inefficient trade which would be the case under more inflationary circumstances. This stability is strengthened by the currency area's size since the greater the area, the more random shocks tend to cancel each other out.

A common currency will also reduce the uncertainty of future exchange rates and possibly the uncertainty about future revenues of firms. Firms can now view the whole area as a single market and thus benefit from greater economies of scale. Furthermore, it may lead to an increase in economic growth and thus an increase in welfare at the same time as it reduces the costs of official interventions in foreign exchange markets (De Grauwe, 2012:54-65 & Salvatore, 2007:732).

The above discussed mechanisms tend to stimulate trade among the members of a currency area such as the case in the EZ, where new trade flows have been generated by the euro and proven to have increased consumer welfare. It is important to keep in mind that welfare gains are likely to increase with the degree of openness of an economy hence the elimination of transaction costs and exchange rate risk will according to De Grauwe (2012:70) "lead to a larger welfare gain (per capita) in small and open economies than in large and relatively closed countries".

Additional revenues can be obtained if the currency becomes international. One is that the currency will be held as an international reserve by foreign central banks and the exchange rate risk will thus be a burden to foreign holders. Another benefit is that foreigners would want to issue debt and invest in assets with that currency and they will therefore boost the activity in domestic financial markets (De Grauwe, 2012:68-69).

But there are also costs, or disadvantages, from an implementation of a common currency which arises from the fact that countries are different, for example differences in legal systems and labor market institutions. Often national monetary policies are adopted to correct for these differences but in a currency area such policies are not possible. Therefore a great cost can be derived from the fact that a country joining a monetary union no longer can revalue or devalue its national currency or change its short-term interest rate. The size of this cost will depend upon the country in question. It is noteworthy to state that the introduction of a single currency may lead to speculative attacks (Carbaugh, 2009:282 & De Grauwe, 2012:18-22).

A common currency can also create new risks that for instance can be specific to the national governments. By entering a monetary union national governments lose their ability of guaranteeing payment of governmental bonds which can disturb the financial markets. As a result, De Grauwe (2012:71) states that "the decline in exchange risk may not necessarily reduce systematic risk [...]".

It is thus reasonable to conclude that the formation of an OCA is more likely to be beneficial:

- the greater the mobility of resources among member countries,
- the greater their structural similarities and
- the more coordinated their fiscal, monetary and other policies are.

3.2 The Economic and Monetary Union (EMU)

3.2.1 Brief background

In 1985, the program of a single market was adopted which aimed to introduce free movement of people, capital, goods and services. The benefits of an internal market could not reach its full potential when having different currencies since it is very costly in terms of transaction costs and unstable and fluctuating exchange rates. As a result, a major reason for adopting the euro was to complete the program and to create a unified market for the EU (European Commission, 2007:6). An additional main reason for adopting the euro was according to Krugman et al. (2012:589) to increase Europe's role in the international monetary system.

There are four additional reasons according to Krugman et al. (2012:593-594) for why the member countries of EU had the goal of a single common currency. Firstly, they believed that the trade among the member countries would increase, the cost of converting one EMS currency

into another was an obstacle that needed to be removed. Secondly, some thought that Germany had a dominant position concerning the policy of EMS and only considered themselves regarding the macroeconomic goals. Therefore, ECB replaced the German Bundesbank and ECB had to consider the problems that all the member countries were faced with. Thirdly, the euro was required in order to complete the goal of free capital movement and finally, national rivalries had led to war in the past and the adoption of the euro was a symbol for Europe's desire to cooperate.

To ensure that a possible member country of the EMU was ready to adopt the euro, the Maastricht convergence criteria were designed. In the words of the European Commission (2007:8) the criteria "provided a common baseline for the stability, soundness and sustainability of public finances for euro area candidates that reflected economic policy convergence and a resilience to economic shocks".

The criteria are:

- *Price stability*, this is measured through the Harmonized Index of Consumer Prices (HICP) and means that the joining country's inflation rate cannot be more than 1.5% above the average inflation rate of the three member countries with the lowest inflation rate, measured the year before the entrance.

- *Sound public finances*, the government's deficit cannot be more than 3% of its GDP.

- *Sustainable public finances*, the general government's debt must be below 60% of its GDP.

- *Durability of convergence*, out of the three best performing countries, in terms of price stability, the long term interest rate for the joining country cannot be more than 2 percentage points above their rates.

- *Exchange rate stability*, the country must maintain a stable exchange rate and participate in the ERM for two years without any severe tensions, i.e. no own initiative to devalue (European Commission, 2006:8 & Krugman et al. 2012:594).

In addition to the criteria described above, the national central banks (NCB's) also need to be able to act independently without political influences.

3.2.2 Characteristics of the EMU

The general policy framework of a single market is to bring down the barriers, i.e. increase the openness between member countries, and simplify the existing framework. The cornerstones of the single market is said to be the "four freedoms", i.e. the free movement of people, capital, goods and services. Within the EU and hence the EMU, policies exist for each of these cornerstones:

- ***Free movement of people***

The free movement of people implies that any resident of the EU has the right to settle in any other member state to, *inter alia,* work or become established. The objective of free movement of people is yet not effective and some practical and legal obstacles still remain, preventing workers from receiving all the benefits from labor flexibility (Europa - Living and working in the internal market, n.d.).

On the other hand, the introduction of the euro brought about wage moderations within the EZ. Firstly, the euro increased competitiveness between the economies of the members since devaluations of the national currency no longer could be used to correct for unsustainable wage increases. Secondly, the prices within the EZ got more comparable which implied an increased competition between firms and thus between workers (Janssen & Mermet, 2003:667).

To increase labor mobility a framework is provided to fight the potential unemployment within the EU. It consists of the encouragement of labor demand by labor tax reductions and a modernization of the wage-setting system. It also reforms the labor market by investing in skills and reducing labor market segmentation. Furthermore, it aims to create a unified labor market by removing the above mentioned legal and practical boundaries to free movement of people (European Commission - European Employment Strategy, n.d.).

- ***Free movement of capital***

The objective of free movement of capital is in the interest of the citizens, companies and governments of the EU. For the citizens the freedom implies the right to invest and put money wherever they like, home or abroad. This is also the case for the European companies but they may, however, own and manage companies in other European countries and receive credit where it is the cheapest. Finally, the freedom means lower borrowing rates for the national governments than before and facilitates the financing of public spending. In the words of the European Commission (2011) this means "that the free movement of capital will lead to an optimal allocation of resources and the integration of open, competitive and efficient European financial markets and services".

Initially the freedom was introduced in the Maastricht treaty where it prohibits "all restrictions on the movement of capital and payments between member states, as well as between member

states and third countries" (Kolassa, 2012:2). On the other hand, this treaty did not imply a full liberalization of capital movements, the member states only had to remove restrictions that were necessary for the functioning of the common market. Today the principle of free capital movement is effective and no further legislation is needed.

- ***Free movement of goods***

Another cornerstone of a single market is free movement of goods and the main objective is to ensure the trade within the EU, making it easy to buy and sell goods. The treaty for free movement of goods aims to create a larger market that businesses can benefit from. With a larger market the competitiveness between companies will increase and it will most likely result in lower prices and thus the citizens will benefit.

Except for goods that pose a danger to the environment, consumer or public health, all goods (including goods from a third country) circulating within the EU are applied under the same conditions of free movement. The Commission monitors so that neither imports nor exports are limited among the member countries and that the mutual recognition principle is ensured (Europa - Single market for goods, n.d.). It is, in the current situation, simple to buy and sell goods in the single market, and the free movement of goods is one of the most successful stories of the European project (European Commission, 2010:8).

- ***Free movement of services***

The free movement of services implies the freedom of establishment in other member countries and/or temporary service in another member country. Today more than 70% of the economic activity consists of services within the EU. Some legislations have been made but there are still major barriers that have proven to have had serious negative effects on the quality and costs of services (Europa - Single market for services, n.d.).

In the initial phase of the EMU there was concluded that there still was a huge gap between the vision of an integrated economy and the reality experienced by the European service providers. Especially small and medium firms and enterprises were affected by complex legal and administrative requirements, this resulted in a disincentive of those firms to establish or provide services within another member country (European Commission, 2013).

Political and fiscal integration

The EMU is a part of the economic integration of the EU and it takes the degree of economic integration to another level. For the union to become fully integrated all member countries need to adopt the euro, since this is not the case, the monetary union consists of an common internal market where the monetary policy only is common for those countries that have adopted the euro. The fiscal policy, on the other hand, is managed by each member country in line with the main objectives of the EMU.

There are several guidelines for the member countries to follow when it comes to economic policies. Some of the broad guidelines for the economic policy are not binding for each member country since they are based on discussions about the economic policy between European institutions and member countries. There are also the recommendations provided by the SGP where the aim is to strengthen the fiscal discipline within the EMU and ensure sound public finances (Europeiska Kommissionen, 2007:1, 9-10).

3.2.3 The trilemma

When policy makers are about to choose the monetary arrangement that fulfill both the internal and the external balance[2] goals they are faced with a trilemma, since all of the following features are desirable for an international monetary system. The trilemma means that they only can choose two out of these three features:

- Exchange rate stability
- Monetary policy oriented towards domestic goals
- Freedom of international capital movement

EMU has solved this trilemma by adopting a fixed exchange rate and allowed for free movement of capital and this has as a consequence led to the fact that the member countries have been forced to sacrifice a monetary policy at the domestic level. (Mongelli 2008:13).

3.3 The European Central Bank (ECB)

3.3.1 Brief background

The Statute of the European System of Central Banks and of the European Central Bank established both the ECB and the European System of Central Banks (ESCB) in 1998. The ECB was founded in Frankfurt as the core of the ESCB and the Eurosystem and took over the monetary policy for the EZ the same year as the euro was launched in 1999. The ESCB consists of the ECB and all central banks of the EU member countries, whether they adopted the euro or not, where those member countries that have adopted the euro constitutes the Eurosystem (ECB - History, n.d.).

The ESCB does not have any legal permission or capacity to act, instead the components of the ESCB have but they are controlled to act in line with the objectives of the system. Thus ESCB operates as an institutional framework to ensure centralization in the decision process and

[2] Internal balance implies full employment and a stable price level, and external balance, on the other hand, implies an optimal level of the current account.

consistency in accordance to the allocation of authorities and aims of the system (Scheller, 2004:42).

The main objective of the ESCB is to maintain price stability, i.e. securing the value of the euro. It should also act in accordance to the open market economy principle with free competition and efficient resource allocation and support the European community with economic policies to contribute to the achievement of its objectives. The basic tasks should therefore be to define and implement monetary policy of the EMU, conduct foreign exchange market implementations, manage the official foreign exchange reserves of the member countries and carry out an efficient function of payment systems (EU, 2008).

The ECB has a central role in the Eurosystem, it ensures that the tasks are either carried out by its own activities or by the NCB's. Besides the above mentioned tasks, the ECB has several specific tasks as for instance being the central point in decision making, to ensure the implementation of its policies and execute supervisory powers and it also has the right to impose sanctions (Scheller, 2004:51).

The ECB is also accountable to the European citizens. Accountability is a core element of democratic structures, it is "the legal and political obligation of an independent institution to properly explain and justify its decisions to the citizens and their elected representatives, thereby making it responsible for fulfilling its objectives" (Scheller, 2004:203).

As mentioned earlier, the ECB is independent of political influences. The concept of independence includes:

- *Institutional independence;* The ECB and NCB's are obliged not to seek instructions from any institutional body, public or private, national or international and these bodies are also obliged not to give any instructions that can affect the main objective of price stability.

- *Legal independence;* The ECB and NCB's are their own legal entities which is necessary for the member independence of the Eurosystem.

- *Personal independence;* states protection for members of decision-making bodies within the ECB and NCB's.

- *Functional and operational independence*; all necessary powers and competencies are assigned to achieve the main objective of price stability.

- *Financial and organizational independence*; The ECB and NCB's have their own financial resources and income. They also enjoy organizational independence (Scheller, 2004:121-124).

According to Scheller (2004:42-43) there are three main reasons behind a system of central banks in favor of a single central bank. One reason is that a single central bank is not acceptable on political grounds, another reason is that central banks of the member countries still are expected to perform tasks that are not related to the Eurosystem. A third reason is that domestic institutions of the members countries are better in place to serve the Eurosystem than a supranational one since there is a large number of different cultures in the EZ.

3.3.2 Monetary policy strategy

The ECB's monetary policy consists of two elements where the first element is the quantitative definition of price stability and the second element is an analyzing tool called the two-pillars approach. The pillar-approach analyses the risks of price stability by two pillars where the first pillar is an economic analysis and the second a monetary analysis.

3.3.2.1 Price stability

Although the Maastricht treaty stated that the main objective of the ECB was to maintain price stability, it did not define what price stability actually meant. The ECB (2011:64) quotes an announced quantitative definition of price stability from 1998 by the governing council of ECB where "price stability shall be defined as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%. Price stability is to be maintained over the medium term". Later, in 2003, the definition was clarified by the governing council "that [...] it aims to maintain inflation rates 'below, but close to, 2% over the medium term'" (ECB, 2011:64).

According to Scheller (2004:80-81) the reference to "the HICP for the euro area" indicates two things. Firstly, the main objective applies the EZ as a whole and secondly it reflects the consumer prices for citizens within the EZ based on a basket of goods and services representative for the households of the EZ.

The "medium term" states that monetary policy cannot fine-tune shocks and offset them over short periods of time. Finally, "below 2%" indicates a clear boundary for price stability and "close to 2%" provides a margin to avoid the risks of deflation.

The objective of price stability contributes in several ways to achieving high economic activity and employment. Here are some beneficial characteristics of price stability:

- *Visualizes relative prices* which make it easier for consumers and firms to make better consumption- and investment-decisions. It also provides more efficient resource allocation and raises the production potential of the economy.

- *Remains price stability in the future* which eliminates the inflation risk of firms and streamlines the capital market. This in turn increases the incentives to invest and promotes economic welfare.

- *Discourages inflation hedging.* For example, in the presence of high inflation individuals and firms tend to stockpile real assets since it retains its value better than money or other financial assets. This kind of behavior averts economic growth.

- *Eliminates distortionary impacts on social security and tax systems.* Price stability eliminates the economic costs that for instance arise from the distortion of tax systems caused by inflation.

- *Maintains social coherence and stability.* It has been shown in earlier centuries that high inflation or deflation tends to cause social and political instability.

The objective of price stability also acts according to the principle of an open market economy with free competition. The operation of the price mechanism is therefore, in conclusion, an essential part of the wellness of a market economy (Scheller, 2004:46-47).

3.3.2.2 Two-pillars approach

Economic analysis

The main focus of the economic analysis is the risks of price stability in the short to medium term. The analysis is based on current economic and financial developments and it takes into account all factors that affect real activities and price developments on the labor market and the market of goods and services. It also needs to pay attention to the nature of shocks that may hit the economy. Thus comprehensive knowledge of how to prevail an economic situation in the presence of economic disturbances is necessary since the main objective of price stability may be threatened.

Variables that provide important information of future inflation include for instance income and other wealth effects, the exchange rate, bond prices and financial yields. Moreover, various measures that contribute to the collection of information are price and cost indices, indicators of fiscal policy, the balance of payments of the euro area and business and consumer surveys (Scheller, 2004:84 & De Grauwe, 2012:184).

Monetary analysis

The relation between monetary growth and inflation are closely related in the medium to long run and the policy that ECB conducts relies on this fact. Compared to the economic analysis, the monetary analysis therefore focuses on a longer time horizon, put differently, it focuses on the long-run link between money and prices. The content of the monetary analysis is a detailed analysis of money and credit developments with the underlying purpose of judging their significance for future changes in inflation and/or economic growth.

The money stock should not increase by more than 4,5% per year, this can be seen as a reference value rather than a target for the money stock growth. This number is based on the trend of future growth of real GDP at 2%, the inflation target which at most can be 2% and the estimated declining rate of money in circulation by 0,5%.

To define money stock, ECB chose M3 as a suitable definition. M1 consists of money in circulation and overnight deposits. M2 consists of M1 plus deposits with a maturity up to two years and deposits which are redeemable at notice up to three months while M3 consists of M2 plus money market fund units/shares, repurchase agreements and debt securities with a maturity up to two years (ECB - Monetary analysis, n.d. & De Grauwe, 2012:185-186).

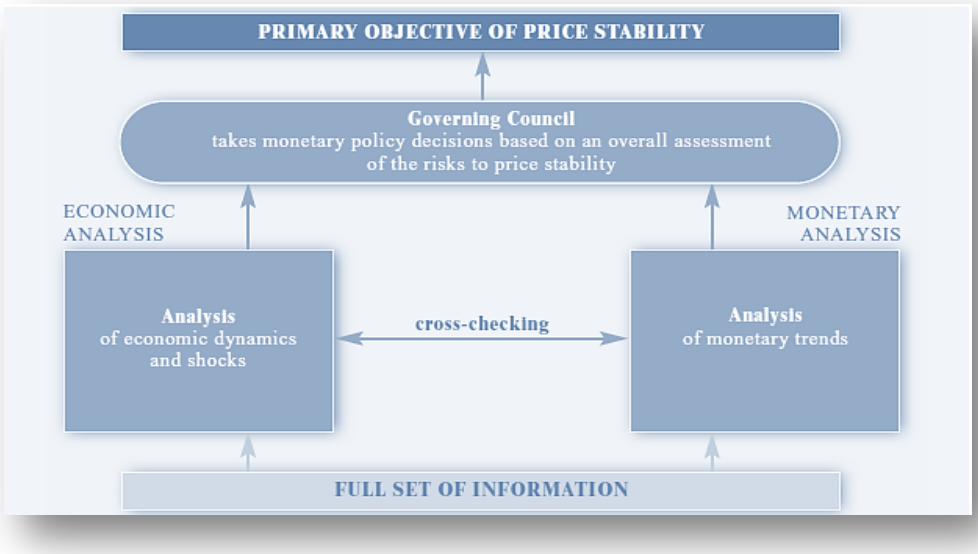

Figure 1. Scheller (2004:83). *The stability-oriented monetary policy strategy of the ECB.*

3.3.2.3 The transmission mechanism of monetary policy

The transmission mechanism describes the way the repo rate, i.e. the discount rate at which the national commercial banks can borrow or deposit funds at the national central bank against securities, affect inflation and the rest of the economy via monetary policy (as illustrated in Figure 2).

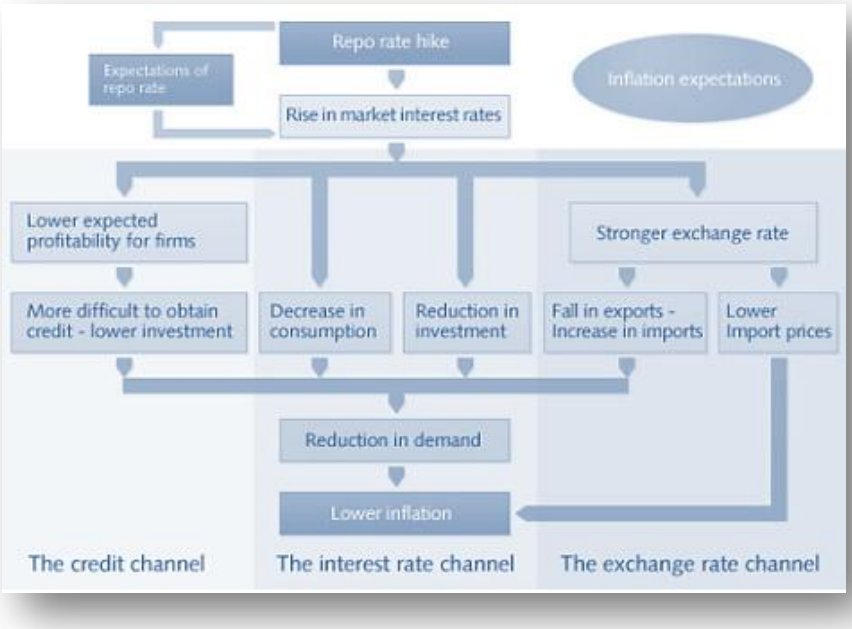

Figure 2. Sveriges Riksbank (2011). *How changes in the repo rate affect inflation.*

The central bank triggers the mechanism by changing the repo rate where a change in the repo rate in turn affects other interest rates. Firstly, the so called overnight rate changes, i.e. the rate at which commercial banks borrow and lend money to one another over the day. Also the market expectations of future official interest rate changes which to some extent would affect the longer term market interest rates. However, interest rates with longer maturity, e.g. 10 years, are not directly affected by the change since these rates often depend on other expectations and trends in the economy. For example, a repo rate hike would raise the market interest rates and in turn affect the saving, investment and consumption decisions of households and firms. It would accordingly decrease the degree of consumption and reduce investments which imply a reduced aggregate demand and hence lower inflation. This process is channeled through the so called interest rate channel.

Moreover, a change in the repo rate would, as mentioned, influence the actions of commercial banks and other institutions. A repo rate hike would thus mean that commercial banks choose to decrease their lending and instead buy bonds. It follows that firms and households would find it more difficult to obtain credit which implies a lower degree of investments and lower expected

profitability for firms. Hence these actions dampen the overall pressure on the economy and reduce inflation.

Monetary policy also affects asset prices and exchange rates. A change in asset prices may affect consumption and investment through wealth and income effects. As a consequence the demand for domestic goods and services will differ from its supply and when for example supply exceeds demand, other things being equal, a downward pressure on prices will emerge. A change in demand can also affect wages and prices in the respective market since the conditions in labor and productive markets may change.

Moreover, an appreciation of the exchange rate would lead to a fall in the price of imported goods which in turn inhibits inflation. If these imports are used in production, lower prices of inputs may result in lower final prices. Moreover, an appreciation of the exchange rate would reduce the domestic country's competitiveness on the international market and decrease the external demand, this decrease would in turn reduce the overall pressure on the economy. The importance of the exchange rate channel depends on how open the economy is to international trade. This channel is, as in the case of the EZ, a less important tool for monetary policy since the EZ is large and relatively closed as an economy (Scheller, 2004:78-79 & Sveriges Riksbank, 2011).

In the case of a repo rate cut, the opposite of what Figure 2 shows would happen and this cut generally implies an attempt to boost the economy and trigger inflation.

3.3.2.4 Main principles of monetary policy strategy

The short term interest rates are affected through the above described transmission mechanism and it is in ECB's interest to take monetary decisions that are consistent and systematic over time. The monetary policy also needs to be forward-looking and preemptive. Given the time lags in the transmission process changes made today may affect the price level after months or even years, thus ECB need to ascertain which policy it should implement today to maintain price stability in the future.

The transmission process disables the monetary policy's ability to offset price level shocks in the short run. Consequently, there is always a large uncertainty surrounding monetary policy which makes it even more important to focus on the perspective of medium term. Since the ECB face large uncertainty a successful monetary policy need to be broadly based, that is not relying on a single model but taking into account all relevant information to more deeply understand the driving factors behind economic development. It is also true that monetary policy will be considerably more effective if central banks anchor the expectations of inflation and hence influence the expectations of economic actors (Scheller, 2004:81 & ECB, 2011:62-63).

3.3.3 Monetary operations

3.3.3.1 Open market operations

The most powerful and important instruments when conducting ECB's monetary policy are the Eurosystem's open market operations (as illustrated in Figure 3). The purpose of these open market operations is to stimulate the money market liquidity, in terms of an increase or a decrease, with the aid of selling or buying tradable assets (De Grauwe, 2012:198).

Main refinancing operations

The most important of the open market operations are the main refinancing operations (MRO's) which play a crucial role in the respect of steering interest rates, deal with the market liquidity and finally point out in which direction the monetary policy is taken into. The MRO's have a maturity of one week and are thus conducted on a weekly basis.

The execution of MRO's is done by standard tenders, and are in the words of Scheller (2004:87) "a type of tender conducted in accordance with a pre-announced schedule and executed within a period of 24 hours from the announcement of the tender to the communication of the results". To participate in these operations the counterparty must fulfill the general selection criteria. An example of a potentially suitable counterparty of the Eurosystem is credit institutions located in the EZ (Scheller, 2004:87).

Out of the four open market instruments that can be conducted, the reverse transaction is the most important and it is used when providing liquidity through an MRO. Such transactions imply trade of legitimate assets by the Eurosystem under the condition of repurchase agreements or as collaterals of valid credits (ECB, 2011:108).

Longer-term refinancing operations

The Eurosystem does not only offer weekly MRO's, they also offer longer-term refinancing operations (LRO's), with a maturity of three months which are conducted on monthly basis. The Eurosystem provide these operations to prevent all the liquidity to be rolled over every week and to offer the banking system a longer-term liquidity. The executions of LRO's are done in the same way as the MRO's. In this case the reverse transactions are used as an open market instrument (Scheller, 2004:87-88).

Fine-tuning operations

Open market operations can also be carried out on an ad-hoc basis, i.e. FTO's. These operations are non-regular in frequency and not standardized in type, they can therefore be liquidity-absorbing or liquidity-providing. The operations aim to manage the liquidity situation and steer the money market interest rate especially when there are unexpected liquidity fluctuations.

FTO's are normally conducted through quick tenders, which have an interval of one hour between the announcement and allocation of results, and bilateral procedures, where transactions

are conducted by the Eurosystem without a tender. FTO's are normally decentralized by NCB's which indicates a high degree of flexibility due to the potential need of rapid actions in case of unexpected market disturbances. They are primarily executed as reverse transactions but they also take the form of foreign exchange swaps, outright purchases or the collection of fixed-term deposits (Scheller, 2004:88).

Foreign exchange swaps consists of simultaneous transactions between the spot and forward rate of the euro against a foreign currency. An outright purchase, on the other hand, implies trade of assets by the Eurosystem outright on the market. In the case with the collection of fixed-term deposits, "the Eurosystem may invite counterparties to place remunerated fixed-term deposits with the NCB in the Member State in which the counterparty is established" (ECB, 2011:107).

Structural operations

Structural operations "are designed to adjust the structural liquidity position of the Eurosystem *vis-à-vis* the banking system, i.e. the amount of liquidity in the market over the longer term" (Scheller, 2004:88). These operations can be performed through reverse transactions, outright purchases or the issuance of ECB debt certificates. The issuance of debt certificates is used to create or enlarge the liquidity shortage in the market and it is, as in the case of reverse transactions, normally carried out with standard tenders. On the contrary, outright purchases are normally executed through bilateral procedures (ECB, 2011:107-108).

Monetary policy operations	Types of transactions		Maturity	Frequency	Procedure
	Provision of liquidity	Absorption of liquidity			
Open market operations					
Main refinancing operations	Reverse transactions	-	One week	Weekly	Standard tenders
Longer-term refinancing operations	Reverse transactions	-	Three months	Monthly	Standard tenders
Fine-tuning operations	Reverse transactions Foreign exchange swaps	Reverse transactions Collection of fixed-term deposits Foreign exchange swaps	Non-standardised	Non-regular	Quick tenders Bilateral procedures
	Outright purchases	Outright sales	-	Non-regular	Bilateral procedures
Structural operations	Reverse transactions	Issuance of debt certificates	Standardised/ non-standardised	Regular and non-regular	Standard tenders
	Outright purchases	Outright sales	-	Non-regular	Bilateral procedures

Figure 3. Scheller (2004:86). *Eurosystem monetary policy operations.*

Minimum reserves

Minimum reserves represent an essential part of the framework of monetary policy. The reserve requirements are not used as an instrument of monetary policy, they are rather used as an instrument to smooth short term interest rates. The ECB can for instance control bank credits through minimum reserves, it can also manipulate the reserve requirements and hence affect the money market (ECB - Minimum reserves, n.d.). As in the example by De Grauwe (2012:202): "an increase in the reserve requirements increases the shortage of liquidity, and tends to reduce the money stock".

3.3.3.2 Foreign exchange operations

The Eurosystem's intervention on foreign exchange markets, i.e. markets with non-euro currencies like the US dollar or the Japanese Yen, is one of the most important foreign exchange operations. The interventions on foreign exchange markets are conducted through the foreign reserves held by the ECB, consisting of gold and foreign currencies, or through the foreign exchange rate mechanism (ERM II). Both the ECB and the NCB's hold foreign reserves but only the reserves held by the ECB are transferred in the purpose of the ESCB. Thus the reserves of the NCB's do not share any purpose of foreign exchange operations but they may eventually be a subject of claim for the ECB.

The foreign reserves aim to ensure that the ECB has sufficient amount of liquid resources at any point in time to conduct a foreign exchange operation. Hence the requirements for the investment of these reserves are liquidity and security. Moreover, the "reserves are managed in such a way as to maximize their value" (ECB, 2011:91, 94-96).

The interventions may be unilateral or concerted, a unilateral intervention implies that the Eurosystem acts on its own and a concerted intervention involves other central banks. The interventions can also be centralized, that is the ECB carrying out the interventions and/or decentralized, that is the NCB's acting through directions on behalf of the ECB (ECB - foreign exchange operations, n.d.).

Since the EZ does not follow a predefined exchange rate policy, the interventions on foreign exchange markets are only conducted when the objective of price stability is threatened due to fluctuations in the exchange rate or if the exchange rate does not signal the true economic strength within the EZ (ECB, 2009).

What is noteworthy is that such operations only did occur two times during the first five years of the EMU. The interventions were made during September and November in 2000 when the euro appeared to be "below the level that could be justified by medium-term fundamentals" (Henning, 2007:327). The rapid depreciation of the euro forecasted inflation within the EZ and threatened the main objective. This resulted in two interventions where large amounts of euro were bought. The first intervention was concerted and involved, *inter alia*, USA, Canada and Japan and the second intervention was unilateral (Henning, 2007:328-329, 330-335).

4. Analysis

The following chapter contains of two parts. The first part will examine the effects of monetary policy on certain defined outcomes and compare these between predetermined countries within the EZ. The second part will compare the properties of the early OCA theory with the characteristics of the EMU and evaluate if these are alike.

4.1 The effects of an expansionary monetary policy

4.1.1 General effects of an expansionary monetary policy on the EZ

Expansionary monetary policy, i.e. a cut in the repo rate, will lead to a number of effects on the overall European economy referring back to the section about the transmission mechanism. Such monetary operations set up by the ECB, i.e. liquidity providing operations, would be reverse transactions, foreign exchange swaps and outright purchases. As a consequence market interest rates will fall which facilitates the spending of both European firms and households. Firms will find it easier to receive credit which results in further investments and hence a fall in unemployment. Moreover, the cost of unemployment will decrease. Consumers will also find it easier to receive credit and therefore increase their consumption which in turn increases the revenues of firms and government and results in a higher degree of GDP growth.

Another outcome of the repo rate cut is, other things being equal, a depreciation of the currency, in this case the euro. A depreciation of the euro will probably increase the EZ's competitive advantage on the international market and tends to increase exports. The price on imported goods will rise which increases the demand for domestic goods, this results in an upward pressure on domestic prices, i.e. inflation. In this case, a depreciation would not imply a fatal outcome for the member countries of the EMU since the balance of trade has been positive during the last year (2012) (see Figure 4) and one can expect that a part of the trade is internal, i.e. between members of the EMU. Figure 4 is based on the total value of international trade for the overall EZ and thus the advantages of a depreciated euro in terms of increased export would probably outweigh the disadvantages of a more expensive import[3].

[3] This reasoning is applied on the EZ as a whole and it may be reconsidered when looking at individual member countries.

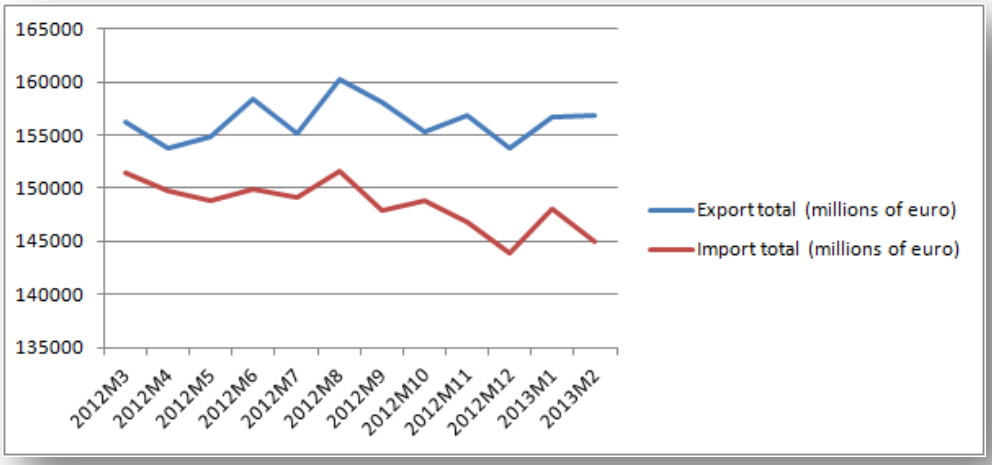

Figure 4. Eurostat – *International trade for the EZ, 2012 M3-2013 M2* (Last updated 2013-04-25).

4.1.2 The effects of an expansionary monetary policy on real GDP growth, inflation, unemployment and trade balance

The effects of a monetary policy are applied on the EZ as a whole and on countries of different size and origin, in this case Germany, France, Greece and Cyprus. The starting point of the analysis is the current situation in each country where yearly data is provided within each category (real GDP growth, inflation, unemployment and trade balance). Previous data is provided to enhance the understanding of historic economic patterns and fluctuations but it is important to keep in mind that Cyprus joined the EMU in 2008 and thus fluctuations before this date is not applicable in the following comparison. The same is the case for Greece who joined in 2001.

The focus of attention in the following paragraphs is to emphasize the effects of an expansionary monetary policy on each country in order to reach a conclusion if one type of monetary policy really fit the needs of all member countries.

4.1.2.1 Real GDP growth rate

The measurement of real GDP is inflation-adjusted, i.e. a country's total output of goods and services are adjusted for price changes, which makes the measurement more applicable than the nominal GDP measure. The nominal GDP can be misleading since GDP growth appears to be higher than it actually is. The real GDP growth rate is a percentage measure of the real economic growth for one period to another, in this case yearly.

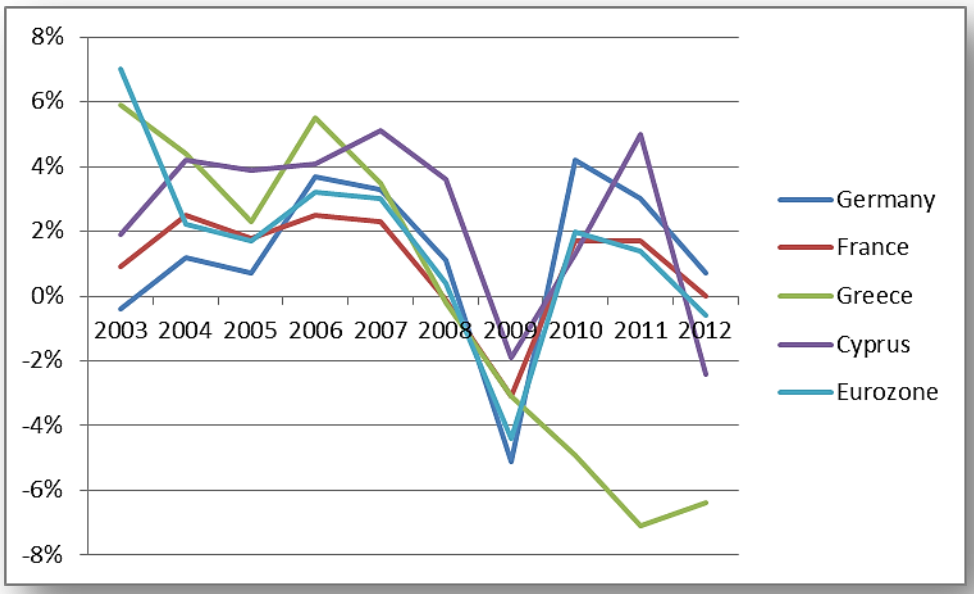

Figure 5. Eurostat – *Yearly real GDP growth rate, 2003-2012 (*Last updated 2013-02-26).

The pattern for real GDP growth becomes evident in Figure 5. Historically, the average trend of economic growth revolves around the future estimation of GDP growth which is said to be 2%. A deviation from the estimated 2 % band occurs during the preliminary phase of the financial crisis and onwards. All countries, except for Greece, still follow the pattern of the EZ. Greece does not recover from the crisis as well as the others and hence experienced a negative growth. Later on, Cyprus unlike Germany and France experienced a sharp fall which has its roots in the present euro-crisis.

4.1.2.2 Inflation

The inflation is based on the HICP which measures a basket of European common goods and services. The HICP is conducted by every member of the EU to help visualize the inflation and make it more comparable between member countries. It also provides the information needed for ECB to formulate the monetary policy of the EZ.

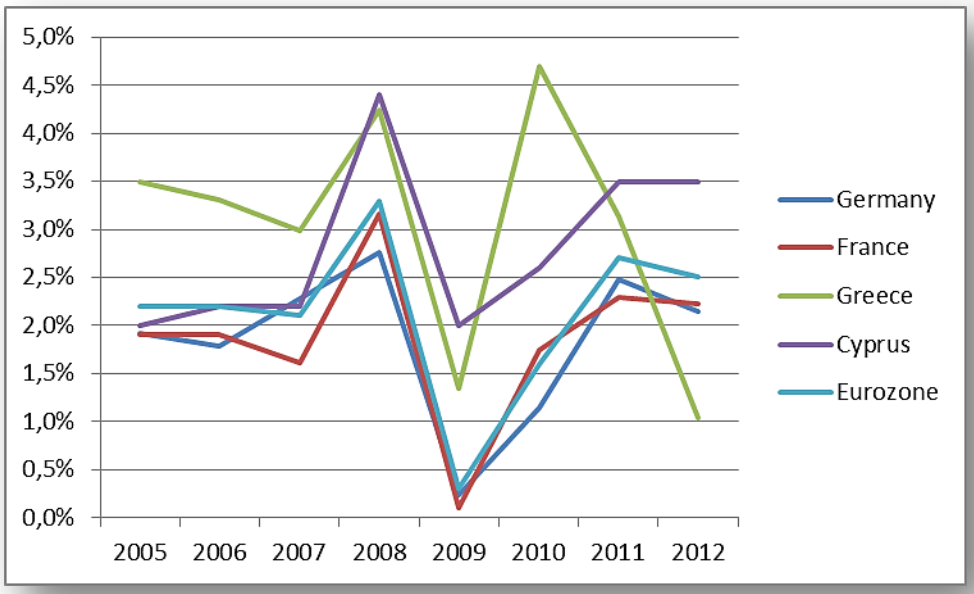

Figure 6. Eurostat – *Annual average inflation rates based on HICP, 2005-2012* (Last updated 2012-10-22), Eurostat - *Inflation dashboard* (Last updated 2013-03-31), Inflation.eu (Last updated 2013-03-31) & Ycharts (Last updated 2013-03-31).

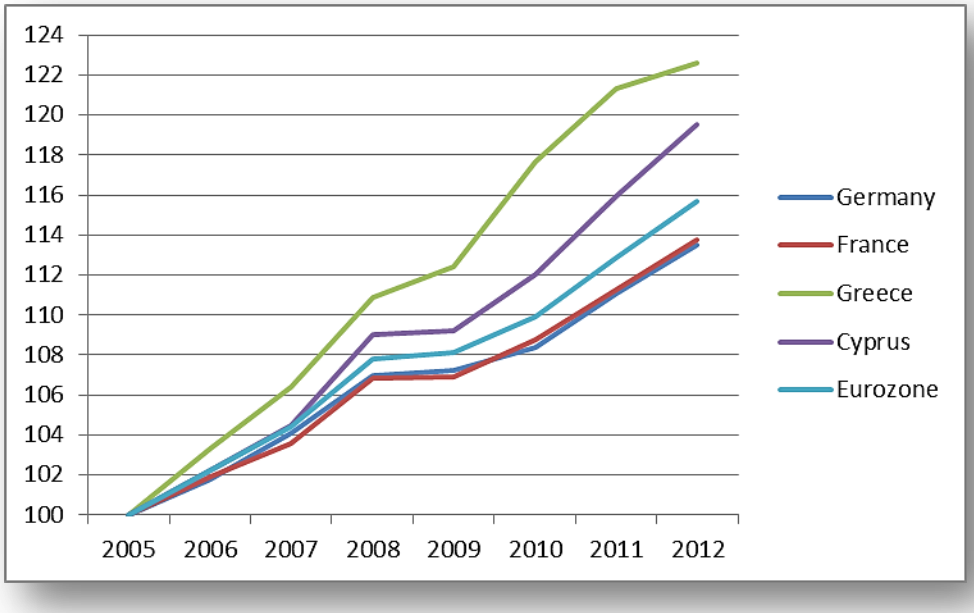

Figure 7. Eurostat – *Harmonized Index of Consumer Prices (HICP) annual average data (2005=100)* (Last updated 2013-03-15).

As mentioned earlier in the report, the main objective for the ECB is to retain price stability. This goal is set out to be a 2% inflation rate in the medium run. When looking at the early period in Figure 6, one can observe that the countries on average, except for Greece, remain around the goal. Greece constantly follows a higher degree of inflation compared to the others during the main period of time. However, in the current situation Greece has a considerably lower inflation compared to the others. On the contrary, Cyprus is distinguished from the others with a higher degree of domestic inflation after joining the EMU whilst Germany and France remain around the target.

In Figure 7 inflation is based on the calculation of HICP where 2005 is the base year. Here the average price of a European basket is more expensive in Greece and Cyprus and cheaper in Germany and France, than in the EZ compared to the price of the same basket in 2005. Figure 7 strengthens the Greek and Cypriot pattern of high inflation in Figure 6 since higher inflation equals higher domestic prices.

4.1.2.3 Unemployment

The unemployment rate measures the unemployed as a percentage of the total labor force. The unemployed are those who are willing to work and actively seek employment. There are different types of temporary unemployment that have to be considered. Firstly, there is the cyclical unemployment which is present in the case of a recession. Secondly, there is the frictional unemployment which corresponds to the fact that employees changes jobs.

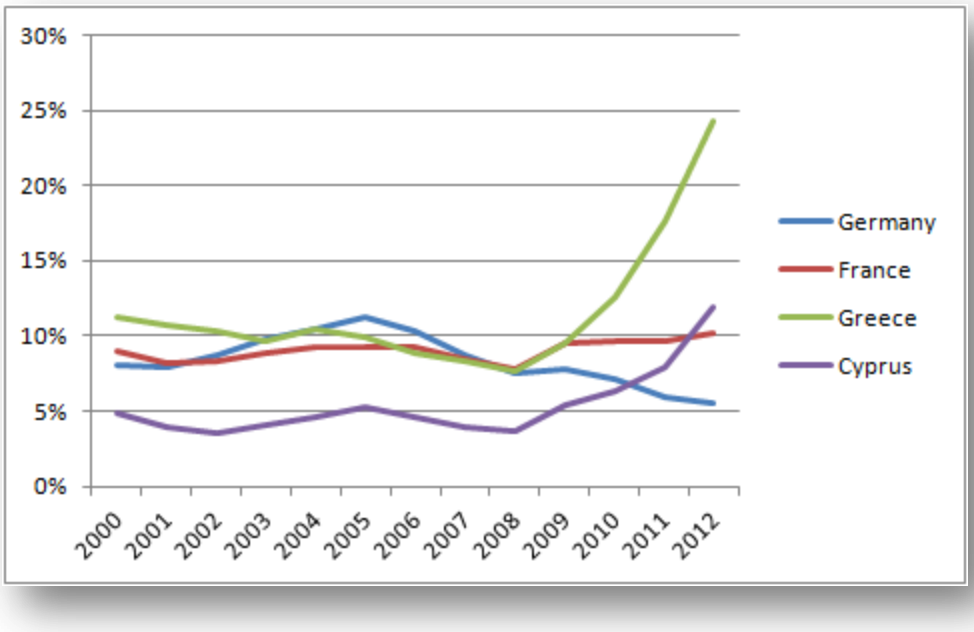

Figure 8. Eurostat – *Total yearly unemployment rate by country, 2000-2012* (Last updated 2013-04-25).

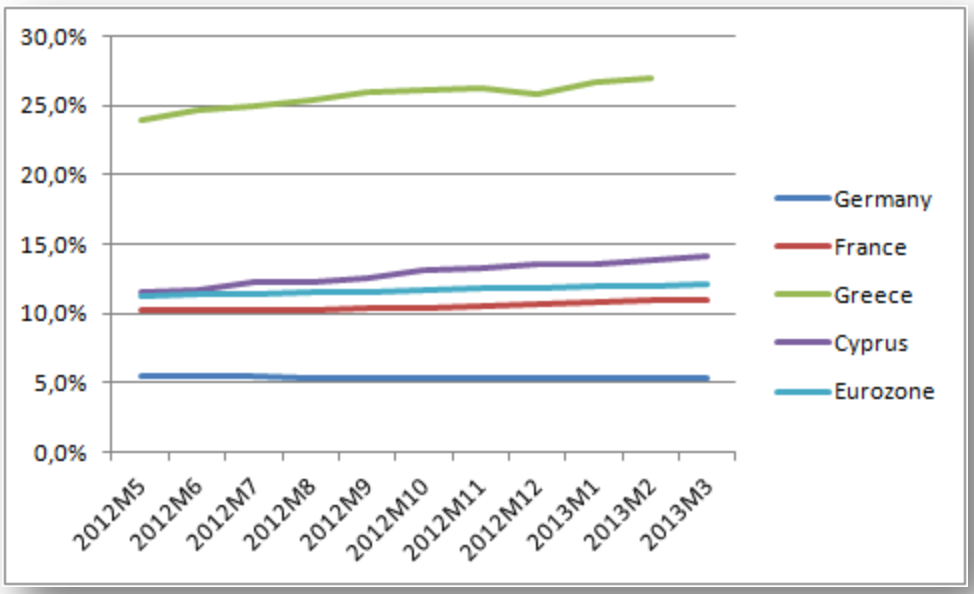

Figure 9. Eurostat – *Harmonized unemployment rate by country, 2012 M5-2013 M3* (Last updated 2013-05-15).

Shown in Figure 8, one can observe that all the countries have experienced a stable level of unemployment until the beginning of the crisis. Cyprus has had a relatively low and stable unemployment rate, about 5%, before joining the EMU compared to the others. After the introduction of the crisis, Greece and Cyprus experienced a peak in their unemployment rates which approximately resulted in a tripling respectively doubling of the unemployment rate. When investigating the last year more closely, Figure 9 shows that Greece and Cyprus still experienced increasing unemployment rates while the rates of Germany and France are fairly unchanged. The unemployment rates in France and the EZ are the highest since the introduction of the euro, about 10% of the work force is out of employment and in fact willing to work.

4.1.2.4 Trade balance

The trade balance is measured as the difference between exports and imports for total products (goods and services) by a reporting country. A net exporter is featured as a net exporter of capital, i.e. capital leaves the country, a net importer, on the other hand, is featured as a net importer of capital, i.e. capital flows in to the country. In general, a net exporter of capital tends to have a lower degree of domestic savings than foreign investments, on the contrary a net importer tend to have higher degree of domestic savings than foreign investments according to the National Income Identity (NII).

It is desirable to achieve a balance in the Balance of Payments (BOP), this implies that the difference between the savings and investments ratio should equal the difference between exports and imports, i.e. the trade balance (Charles Nadeau, personal communication, 2012-12-05).

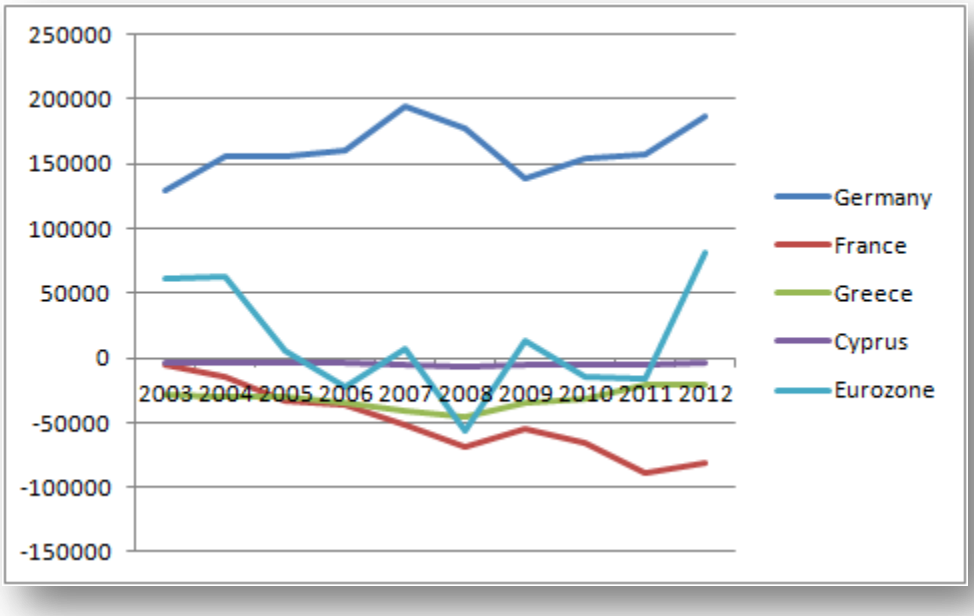

Figure 10. Eurostat – *Trade balance (total product) in millions of euro, 2003-2012* (Last updated 2013-04-25).

Figure 10 clarifies the trade of goods and services in each country where one can observe that France, Greece and Cyprus are importing countries, i.e. they have a negative trade balance. However, Germany has a strong trade surplus and thus exports far more than they import. The EZ is characterized by a fluctuating trade balance, where it one year experiences a trade surplus and another year a trade deficit. One might believe that the average trade balance of the EZ is affected by countries with extreme positive or negative trade balances, as in the case of Germany. But this correlation cannot be demonstrated in Figure 10 since the remaining 13 member countries are not taken into account[4].

To reach a conclusion about the effect of a potential depreciation and whether the exchange rate has a major impact on the trade balance or not, the historic fluctuations of the euro against the

[4] The remaining 13 countries are: Austria, Belgium, Estonia, Finland, Ireland, Italy, Luxembourg, Malta, Netherlands, Portugal, Slovakia, Slovenia and Spain.

USD has been taken into consideration (see Figure 11). When the euro appears to be weak against the USD, that is 2003 as well as 2008 and 2011, the expected pattern would be increased export and reduced import, i.e. a strengthening of the trade balance. On the other hand, when the euro appears to be strong against the USD, that is 2005 and 2012, the expected pattern would be the opposite. When comparing Figure 10 and 11 one cannot distinguish such pattern which reasonably would be due to other factors that have not been taken into account. It could also be due to the fact that the importing/exporting countries trade with partners within the EZ, i.e. a possible depreciation has no effect since they share the same currency[5].

Figure 11. Eurostat – 1 *USD/EUR, 2003-2012* (Last updated 2013-02-26).

[5] Other factors that affect the trade balance are the current euro-crisis, the economic situation in general (i.e. recession or boom) and other trade policies (taxes etc.). It is also noteworthy that only the USD is taken into account when analyzing trade patterns hence the comparison between the euro and the USD is not applicable on other major currencies.

4.1.3 Outcome and comparison

An expansionary monetary policy based on the current situation in each country would, ceteris paribus, imply an expected increase in the degree of real GDP growth if the nominal GDP growth exceeds the forthcoming inflation that is caused by higher aggregate demand. In this case, such an event would be beneficial for all countries but may be more desirable for Greece and Cyprus since these two experiences a lower (negative) growth than the others[6].

An expansionary monetary policy would also, ceteris paribus, increase the aggregate demand and thus trigger a higher degree of inflation. This would imply a worsening of the Cypriot situation since the economy already suffers from a high inflation and it would also imply an increased cost of living for the Cypriot residents. In the case of Greece a further increase in the cost of living would tend to inhibit consumption instead of increasing it. The outcome of an increased inflation in the present situation in Greece is hard to predict but in the longer term it would imply even higher costs of living for the Greek residents. This is the opposite effect of what an expansionary monetary policy aim to accomplish. A higher inflation in Germany and France would, on the other hand, not be a disaster since these countries do not suffer from a high cost of living and thus the outcome of an expansionary monetary policy would probably be more successful.

The predicted increase in the real GDP growth rate and inflation would theoretically result in a reduction in unemployment rates in all countries. This is one of many desirable outcomes of expansionary monetary policy. An expansionary monetary policy would also imply a depreciation of the euro as mentioned earlier.

In the present situation, all the evaluated countries are faced with a low or negative real GDP growth rate. This is not a desirable situation because it is not sustainable in the long run and does not attract foreign investors due to a climate of low interest rates. A repo rate cut would imply lower interest rates which would discourage foreign investors even more but instead encourage domestic investors[7]. In the case of Germany and France, only a repo rate cut would probably not discourage foreign investors since the countries are well-developed, i.e. they have a good infrastructure, skilled and productive labor force etc.

On the other hand, the positive outcome of increased domestic investments may not be achievable within the context of the Greek investment climate and the Cypriot economic situation. The Greek domestic investors may have a moderate attitude towards new investments and the monetary policy may therefore face difficulties with reaching its full potential. The moderate attitude arises from the phase after the financial crisis which has complicated the

[6] Of course, the growth in real GDP does not sincerely depend on the conducted policy but also other factors as for instance the current economic situation and trends, the investment climate, natural disasters etc.

[7] It is not only the level of interest rate that determines whether a country is attractive to invest in, other factors also matters for investments such as the risks and costs of investing and domestic investment policies.

situation for Greece and discouraged domestic businesses to invest. Greece is thus a less attractive place to invest in since it has few investable industrial sectors. Also the domestic commercial banks face difficulties with their lending and the Greek government suffers from financial difficulties (Sveriges Ambassad, n.d.).

Cyprus suffers from a deep financial crisis where the banking sector is insolvent and the inflation level is higher than the target. Thus the effects of an expansionary monetary policy may worsen Cypriot living standards. The effects of a high inflation leads to an increased uncertainty which implies difficulties for consumers and firms to plan ahead. Consumers lose their purchasing power while the inflation erodes savings over time and firms face higher costs and are thus more risk averse. Commercial banks tend to charge higher interest rates to protect themselves from the inflation which definitely would discourage domestic investors (European Commission - Focus on inflation, n.d.).

Furthermore, a higher degree of domestic inflation and fewer investments may in the case of Cyprus not contribute to reduce the unemployment rate which implies that the cyclical unemployment rate will remain. Cyclical unemployment may also be the case in France even though an expansionary monetary policy has been implemented. One can only conclude that Germany has reduced their unemployment rate during the fight of the recession which is the general policy effect. However, there is to expect a greater policy effect on reducing unemployment in France than in Germany since Germany is already experiencing a stable rate of unemployment. Also compared to Greece and Cyprus, France has the right prerequisites in terms of, *inter alia*, investment climate, consumer purchasing power and labor force skills to fight unemployment during the guidance of an expansionary monetary policy.

Recalling to the prior discussion about the Greek unemployment rate, one can state that Greece has experienced a volatile inflation and a high domestic price level during a longer period of time which ultimately has resulted in an extremely high unemployment rate. If this pattern continues a decrease in the unemployment rate would not appear and it seems to be other obstacles than the conducted policy that affect the unemployment in Greece[8].

To aggravate the situation for net importing countries an expected depreciation of the euro, which is the case of an expansionary monetary policy, would raise the domestic prices of goods and services. On the contrary, a net exporter would face increased competitiveness on the international market and thus benefit from a potential depreciation. It is difficult to tell whether this would benefit or disfavor the importing countries, i.e. would the advantages of increased exports consider the drawbacks of the more expensive imports? On the other hand, referring back to the discussion about trade balance (section 4.1.2.4), one might expect that the intra-regional

[8] There are several other factors that must be taken into consideration when studying the phenomena of unemployment which falls beyond the scope of this report.

trade is an essential element which implies that the member countries are not as affected by fluctuations in the exchange rate as anticipated.

4.2 Investigating the optimality of EMU

4.2.1 Comparison of the early OCA properties and the EMU

4.2.1.1 Factor mobility

Factor mobility states to which extent a factor of production, like labor or capital[9], is able to move across countries or industries. In the case of the EZ, the objective of free movement of capital is working with little or no interference which implies a high mobility of capital between member countries. This allows for investments by people, companies and commercial banks across national borders in order to seek higher returns.

In principle, there are no boundaries for labor mobility within the EZ since the introduction of free movement of people. In the case of the EZ, the main reasons for labor migration are wage differentials and employment opportunities. The extent to which labor migration might happen also varies due to geographical proximity, language and culture, the length of the stay which increases the opportunity of employment, the transferability of skills between different countries and existing social networks abroad (Bräuninger & Majowski, 2011:8).

All member countries of the EMU are different in terms of language and culture which tend to facilitate the movement between countries that are alike, e.g. Portuguese residents tend to migrate to countries like Spain and other similar linguistic countries like Italy and France whilst Belgian residents often migrates to Germany.

Still labor mobility appears to be limited within the EZ even without legal boundaries, according to Krugman et al. (2012:605, 609) this is partly due to governmental regulations. With a limited degree of labor mobility there is a risk of increased unemployment since member countries cannot divert economic shocks via labor migration. This imposes a greater demand for wage and price flexibility within the EZ to help absorb such economic shocks.

In sum, this can be recognized as the theory of the second best which implies, in the words of Krugman et al. (2012:608), "that liberalization of one market (the capital market) can reduce the efficiency of EU economies if another market (the labor market) continues to function poorly".

[9] There are also other factors of production besides labor and capital, but these factors are not taken into account in this analysis.

4.2.1.2 Price and wage flexibility

When joining a monetary union, such as the EMU, wage and price flexibility plays a central role since they have to adapt, when an exchange rate policy is no longer possible, to restore the loss of international competitiveness. The consequences of less flexible wages and prices are more persistent negative output gaps and increased structural unemployment. This implies a prolonged recession and a possible decline in wages and prices in order to restore competitiveness (Matthes, 2009:114, 120).

Price flexibility implies a price adjustment in the long run in response to market fluctuations and it ensures that full-employment will remain in the long run aggregate production. In the case of EMU, rigid product and labor markets, as discussed above, are the main reasons for price rigidity which in turn has led to inflation persistence. In fact, the past average prices in the EZ changed less frequently compared to the US which implies less price flexibility (Economic Glossary, n.d. & Matthes, 2009:117).

In the words of the European Commission (2003:209) "wages as the price of labor have a key role to play in determining the overall balance of supply and demand in the labor market [...] If wages are too rigid, the necessary adjustment will come slowly and with considerable economic and social costs [...]". Wage flexibility can be measured in nominal and real terms where real wage flexibility is defined as the degree of responsiveness to, *inter alia*, changes in productivity, labor market disequilibrium and the stickiness of wages (European Commission, 2003:212).

According to Heinz and Rusinova (2011:5) the real wage flexibility tends to be somewhat weaker when the unemployment rate is above the natural level, i.e. during a recession, compared to the opposite case, i.e. an economic boom. In the current situation, EMU is experiencing an extensive recession which in the reasoning of Heinz and Rusinova would imply a lower degree of real wage flexibility. However, wage flexibility within EMU is also strongly affected by collectively agreed wages which is the result of labor union bargaining and by national labor laws and controls. The wage flexibility among the union members differs and it has been proven that the necessary real wage adjustment is not sufficient enough to fight unemployment (European Commission 2012:42).

The EZ as a whole appears to have lower real wage flexibility compared to the central and eastern European countries, i.e. former socialist countries, and the result of the study performed by Babecky and Dybczak (2008) proposes that a potential adoption of the euro does not necessarily lead to automatically higher real wage flexibility.

4.2.1.3 Financial integration

As a result of the euro it has been proven, according to Krugman et al. (2012:608), that the financial markets across member borders have become more integrated with each other. In general, financial integration has promoted financial development and lowered the transaction costs within the EZ. Financial integration has improved the allocation of capital and lead to

improved productivity and innovation. The capital movements have to some extent improved welfare for the residents of the EZ and brought together the interest rates in the member countries.

The financial integration is suggested to have had the greatest financial impact on countries with less developed financial systems. It has also improved the total factor productivity of more advanced economies and lowered the cost of capital for emerging and developing countries (Lane, 2008:13, 26-27).

Within the EZ, financial integration has occurred in different phases and it did almost immediately integrate in the money and public debt markets but is still incomplete in the equity, repo, corporate bond and credit markets. For a market to be fully integrated the law of one price must hold on all markets, in the case of EMU, the price of raising capital is different across national borders in the incomplete markets (Jappelli and Pagano, 2008:9).

According to the most recent report about financial integration in Europe the ECB (2012:15) states that "the collapse of Lehman Brothers in the second half of 2008 led to deterioration in market confidence, which resulted in reduced financial integration". This scenario applied for the money market and monetary policy interventions were later implemented to temporarily improve the integration of the market. The financial crisis did also lower the financial integration in the banking markets within the EZ.

The bond markets have recently experienced some tensions which resulted in a reduced demand for certain bonds, according to the ECB (2012:24) does this "not necessarily imply lower financial integration across borders". The same is the case for the equity market although it experienced a lower degree of cross-country heterogeneity (ECB, 2012:24, 27).

The process of financial integration is said to be far from complete. Due to the continuous enlargement of the EZ and the ongoing uncertainty in the European banking sector further actions are needed to improve the stability of the European financial framework (Lane, 2008:12, 27).

4.2.1.4 Economic openness

An open economy is referred as an economy where there are no barriers that mutually prevent the free movement of people, capital, goods and services between countries. The member countries of the EMU are relatively small and open economies but the free movement of people and services appears to be limited. On the other hand, EMU as a whole is a large and relatively closed economy compared to the individual countries but it is simultaneously more open than for example the US and Japan. Additional openness has been achieved with the euro since it leads to a greater price transparency and hence international prices are more likely to be transmitted into domestic prices as mentioned earlier (ECB - Key characteristics of the euro area, 2013).

4.2.1.5 Diversification in production and consumption

The EZ is characterized by a well-diversified production and consumption, this implies that each member country of the EMU is active in several economic sectors and that the residents of each country consume across several sectors. Diversified production and consumption reduces the risk of asymmetric shocks that may hit the economy.

The diversification in production and consumption depends, *inter alia*, on the degree of similarity concerning economic structures. The economic structures of the member countries of the EMU are rather dissimilar but some similarities exist. One similarity is their manufacturing structure which is the evidence of high intra-industry trade. As a result of the intra-industry trade another similarity emerges as similar cross-border consumption. On the contrary, the member countries differ in terms of legal and social security systems. Another important difference is the degree of skilled labor where high skilled labor normally originates from the northern Europe and low skilled labor from the southern Europe.

After the introduction of the euro and the single market, which mainly affected the trade through increased competition, an even higher degree of diversification in production has been achieved. As a result the manufacturing structures within the member countries of the EMU may change due to new strategic behavior of firms. Firms may choose to specialize in a certain sector which implies a lower diversification in production and a greater vulnerability towards asymmetric shocks (ECB, 2005-03-09).

In theory, two views are presented that describes the relationship between economic integration and asymmetric shocks. The first view is of the European Commission where the relationship is stated to be positive, i.e. increased economic integration between countries will increase the symmetry and thus reduce the occurrence of asymmetric shocks. The second view is performed by Krugman (Krugman et al, 2012:607) where the relationship between economic integration and asymmetric shocks is negative, i.e. the symmetry is reduced when the integration increases. He states that countries tend to become more specialized within a certain sector when economic integration increases and thus asymmetric shocks will occur more frequently and countries production structures will hence become less diversified (De Grauwe, 2012:23-26).

The EZ is said to support both of these views (ECB, 2005-03-09). However, according to Krugman et al. (2012:607) it is not yet evident if the completion of the European single market will remove the differences in economic structures or encourage regional specialization and hence it is difficult to forecast the future degree of diversification.

4.2.1.6 Similar inflation rates

As mentioned earlier, similar inflation rates across member countries have proven to reduce the need of exchange rate adjustments. When experiencing similar inflation rates it becomes easier for the ECB to conduct a coherent policy in the case of a recession or an economic boom.

In the case of the EMU, appendix 1 shows that the average annual inflation rates for the member countries are rather similar across time except for some outliers like Estonia in 2011 that experienced a high average annual inflation rate. These outliers and the average yearly differences in inflation rates can be due to differences in structural developments, labor markets, social preferences and economic policies (Mongelli, 2008:3). The difference in inflation rates during the most recent years are according to Matthes (2009:118) due to different output gaps. In southern Europe prices increased faster than in for example Germany and resulted in considerably lower real interest rates, this has in turn increased domestic demand, output gap and inflation. However, the ECB has still achieved its main objective of price stability in the medium run.

4.2.1.7 Fiscal and political integration

As mentioned earlier, countries lose an important instrument of monetary policy when joining a currency area, i.e. the exchange rate. To compensate for this loss, wage flexibility, labor mobility and fiscal policy must be present and well-functioning.

A substitute for the exchange rate in the case of a currency area is a centralized budget that absorbs asymmetric shocks. Centralization implies a redistribution of income, i.e. income from countries experiencing a positive shock is transferred to countries hit by a negative shock. This requires willingness for the member countries to undertake this commitment to one another which may not always be the case. One might believe that for example Germany is more willing to cooperate when it favors themselves rather when it favors another member country.
In the case of EMU, centralization may not be possible and the national fiscal policies should instead be used in more flexible ways. There should hence exist an automatic budgetary stabilizer where countries experiencing a negative shock are allowed a budget deficit increase through the stabilizer (De Grauwe, 2012:208-209).

As analyzed in the previous paragraphs, one has found that the labor mobility and wage flexibility are still fairly limited and a more integrated fiscal policy is thus needed. In the case of centralization, the question is how much centralization that is actually needed and possible for the EMU. Today the EU has limited taxation powers and it can only practice fiscal policy to a small extent (Krugman et al, 2012:607).

Although, as important as it is to have a well-integrated fiscal union, it is equally important to have a well-integrated political union. A political union reduces the risk of political asymmetric shocks and it makes it possible to centralize a part of the national budgets of the member countries on a union level. This provides in turn insurance against asymmetric shocks by

organizing a system of automatic fiscal transfers that function the same way as in the case of a redistribution of income (De Grauwe, 2012:128).

There are different views of how politically integrated the EMU should be. In the view of Enderlein and Verdun (2009:500-502) EMU has during the first decade been characterized as a successful construction of a functioning monetary union even though EMU today may not be what some expected it to be 10-15 years ago. They stated that, based on the performance of EMU in the first decade of its existence, a further political integrated union does not seem to be necessary. On the other hand, Jaumotte (2011) and Krugman et al. (2012:609) advocates the need of a more politically integrated union where the EMU and the member countries need a fundamental transformation of the policy-making process to succeed in the long run and to attain all the benefits of the euro.

5. Conclusions

The presented theory and the performed analysis have laid the foundation for the formulation of our findings. The theory of OCA has helped us to form an opinion about the EMU and its optimality as well as the outcome of the conducted monetary policy.

Our findings in the first part of the analysis suggest that the outcome of an expansionary monetary policy differ across the evaluated countries based on the current situation. Ideally, a well-functioning monetary policy would want to have the same or similar outcome in all member countries which in turn requires the member countries of a monetary union to be fairly alike. In the case of the EMU, we have found that Greece and Cyprus are the countries that benefit less than Germany and France. However, the current situation indicates a need for expansionary monetary policy and the occurred differences can thus be due to the diversity in economic structures. So even if the policy disfavors Greece and Cyprus, it is the only way the ECB can contribute to a stimulation of the economy within the EZ and it is thus partly up to the individual member countries to undertake structural reforms to try to emerge from the current recession.

Our findings fall in line with the results of the study by Rossi (2006:14) where he concludes, based on the situation in 2006, that "it seems difficult, if not really impossible, for the single monetary policy of the ECB to do justice, at the same time, to the different needs of all countries within Euroland".

Our findings in the second part of the analysis display similarities between the early OCA properties and the characteristics of the EMU. Despite this the EMU is still characterized by essential differences compared to the theory in terms of low labor mobility, rigidities in prices and wages and limited economic integration. Even if all the properties are not met simultaneously, which is not a requirement for an OCA, we believe that even if the EMU has come a long way there are still properties that needs to be improved in order for the EMU to become an OCA in the future. The result of the first part of the analysis supports this conclusion since it proclaims that one size of monetary policy does not fit the current needs of all member countries.

We can distinguish some main challenges for the EMU based on our results. One challenge is to improve the labor mobility, there are only about 1,5% of the population of EU25 that lives and works in a foreign country (Matthes, 2009:119). Another challenge is to more deeply integrate the European financial markets and strengthen the European banking sector. Moreover, the EMU needs to be more fiscally and politically integrated in order to manage challenges that may come ahead.

Some concluding lessons can also be drawn from the formation of the EMU. It is, *inter alia*, important to know that it can take a long time to form a monetary union but when it is well-

functioning a member country can draw several benefits from joining. On the contrary, later experiences have shown that there also are costs of joining which in the case of EMU consists of slow economic growth. The absence of national monetary policy has also left its marks on the individual member countries in terms of more restrictive fiscal policies.

The 8th of May this year the ECB lowered the repo rate to an extremely low level of 0,5% which indicates a belief of a continued recession and remained low inflation in the medium run (ECB, 2013-05-02). The repo rate cut intends to have positive effects on the overall European economy, and to obtain an outcome other than the one we have described in the analysis, the member countries need to plan ahead, i.e. implement reforms that are sustainable in the long run. It can be demonstrated that monetary policy does not solve all problems, therefore, EMU faces an important choice – remain as they are and probably face a worsening of the current situation or move towards a more fiscally and politically integrated monetary union.

In this field of topic, further research can be made to investigate the weaknesses of the EMU and how it would have performed in the absence of these weaknesses. For example, the reasons for the low degree of labor mobility or how the monetary union would have performed if labor mobility instead were high. Another interesting investigation would be to investigate how the EMU would have performed with a high degree of centralization of for instance fiscal policy. These scenarios may be possible and realistic for the future of EMU since we believe that it is not fully developed and that these aspects, among others, needs to be improved.

References

Textbooks

Burda and Wyplosz (2009). *Macroeconomics.* Fifth edition. New York: Oxford university press.

De Grauwe, Paul (2012). *Economics of monetary union.* Ninth edition. Oxford: Oxford university press

Krugman, Paul R., Obstfeld, Maurice and Melitz, Marc J (2012). *International economics, theory & policy.* Ninth edition. Harlow: Pearson education limited.

McDonald, Frank and Dearden, Stephen (2005). *European Economic Integration.* Fourth edition. Harlow. Pearson education limited.

Salvatore, Dominick (2007). *International economics.* Ninth edition. Hoboken: John Wiley & sons Inc.

Online references

Babecky, Jan & Dybczak, Kamil (2008). *Real wage flexibility in the enlarged EU: evidence from a structural VAR*. [Electronic]. Available: <http://www.thefreelibrary.com/Real+wage+flexibility+in+the+enlarged+EU%3A+evidence+from+a+structural...-a0178945164> [2013-05-13]

Blanchard, Olivier, Dell'Ariccia, Giovanni & Mauro, Paulo (2010). Rethinking Macroeconomic Policy. [Electronic]. *International Monetary Fund.* Available: <http://www.imf.org/external/pubs/ft/spn/2010/spn1003.pdf> [2013-04-27]

Bräuninger, Dieter & Majowski, Christine (2011-09-20). Labor mobility in the euro area. [Electronic]. *Reports on European integration,* EU monitor 85, Deutsche Bank Research. Available: <http://www.dbresearch.com/PROD/DBR_INTERNET_EN-PROD/PROD0000000000278645.PDF> [2013-05-09]

Carbaugh, J. Robert (2009). *International economics.* Twelfth edition. Mason, OH: South-Western cengage learning. Available: <http://books.google.se/> [2013-04-13]

ECB (2012). *Financial integration in Europe.* [Electronic]. Available:<http://www.ecb.int/pub/pdf/other/financialintegrationineurope201204en.pdf> [2012-05-09]

ECB / Home / Press / Speeches and interviews / By data / 2005 / 9 March 2005 (Last updated 2005-03-09). [Electronic]. Available: <http://www.ecb.int/press/key/date/2005/html/sp050309.en.html> [2013-05-11]

ECB / Home / Press / Speeches & interviews / By date / 2009 / 6 April 2009. (Last updated 2009-04-06). [Electronic]. Available: <http://www.ecb.int/press/key/date/2009/html/sp090406.en.html> [2013-04-14]

ECB / Home / The European Central Bank / Educational / FACTS slides / European integration / Slide 10 - Key characteristics of the euro area (Last updated 2013-01-31). [Electronic]. Available: <http://www.ecb.int/ecb/educational/facts/euint/html/ei_010.en.html> [2013-05-09]

ECB / Monetary policy / Instruments / Introduction / Minimum reserves (n.d.). [Electronic]. Available: <http://www.ecb.int/mopo/implement/intro/html/index.en.html#operations> [2013-04-23]

ECB / Monetary policy / Strategy / Monetary analysis (n.d.). [Electronic]. Available: <http://www.ecb.int/mopo/strategy/monan/html/index.en.html> [2013-04-17]

ECB / Organisation / Tasks / Foreign exchange operations (n.d.). [Electronic]. Available: <http://www.ecb.int/ecb/orga/tasks/html/foreign-exchange.en.html> [2013-04-21]

ECB / The first ten years / History (n.d.). [Electronic]. Available: <http://www.ecb.int/ecb/10ann/history/html/index.en.html> [2013-04-14]

ECB (2011). *The monetary policy of the ECB. 2011*. [Electronic]. Available: <http://www.ecb.int/pub/pdf/other/monetarypolicy2011en.pdf> [2013-04-16]

Economic Glossary / Search / Definition of price flexibility (n.d.) [Electronic]. Available: <http://glossary.econguru.com/economic-term/price+flexibility> [2013-05-13]

Enderlein, Henrik & Verdun, Amy (2009). EMU's teenage challenge: what have we learned and can we predict from political science?* [Electronic]. *Journal of European Public Policy*, vol. 16:4, p. 490-507. Available: <http://henrik-enderlein.de/enderlein_verdun_jepp2009.pdf > [2013-05-12]

Europa / Summaries of EU legislation / Internal market / Single market for goods (n.d). [Electronic]. Available: <http://europa.eu/legislation_summaries/internal_market/single_market_for_goods/index_en.htm > [2013-05-02]

Europa / Summaries of EU legislation / Internal market / Single market for services (n.d). [Electronic]. Available: <http://europa.eu/legislation_summaries/internal_market/single_market_services/index_en.htm> [2013-05-02]

Europa / Summaries of EU legislation / Internal market / Living and working in the internal market (n.d.). [Electronic]. Available: <http://europa.eu/legislation_summaries/internal_market/living_and_working_in_the_internal_market/index_en.htm> [2013-05-02]

European Commission / Economic and Financial affairs / Focus on / Focus on inflation (n.d.). [Electronic]. Available: <http://ec.europa.eu/economy_finance/focuson/inflation/consequences_en.htm> [2013-05-08]

European Commission / Employment, Social affairs & Inclusion / European Employment Strategy (n.d.) [Electronic]. Available: <http://ec.europa.eu/social/main.jsp?catId=101&intPageId=1865&langId=en> [2013-05-02]

European Commission (2010). *Free movements of goods. Guide to the application of treaty provisions governing the free movements of goods.* [Electronic]. Available: <http://ec.europa.eu/enterprise/policies/single-market-goods/files/goods/docs/art34-36/new_guide_en.pdf> [2013-05-02]

European Commission / Internal Market / Free movement of capital / Overview (Last updated 2011-09-06). [Electronic]. Available: <http://ec.europa.eu/internal_market/capital/overview_en.htm#when> [2013-05-02]

European Commission (2012). *Labor market developments in Europe 2012*. [Electronic]. European Economy, no. 5. Available: <http://ec.europa.eu/economy_finance/publications/european_economy/2012/pdf/ee-2012-5_en.pdf> [2013-05-13]

European Commission (2006). *One currency for one Europe. The road to the euro*. [Electronic]. Available: <http://ec.europa.eu/economy_finance/publications/publication6730_en.pdf > [2013-04-10]

European Commission (2003). The EU economy: 2003 review. [Electronic]. *Directorate-General for Economic and Financial Affairs*, no. 6. Available: <http://ec.europa.eu/internal_market/capital/docs/europeaneconomy_en.pdf> [2013-05-13]

European Commission / The EU single market / Top layer / A single market for services (Last updated 2013-04-30). [Electronic]. Available: <http://ec.europa.eu/internal_market/top_layer/services/index_en.htm> [2013-05-02]

Europeiska Kommissionen (2007). *En valuta för ett Europa. Vägen fram till euron.* [Electronic]. Available: <http://ec.europa.eu/economy_finance/publications/publication6730_sv.pdf> [2013-05-06]

Europeiska Kommissionen / Sverige / Viktiga områden / EMU och euron (Last updated 2012-01-18). [Electronic]. Available: <http://ec.europa.eu/sverige/key_issues/euro/index_sv.htm> [2013-04-13]

European Union (EU) / Europa / EU law / EU treaties (n.d). [Electronic]. Available: <http://europa.eu/eu-law/treaties/index_en.htm> [2013-04-10]

European Union (EU) (2008). On the Statute of the European System of Central Banks and of the European Central Bank. [Electronic]. *Official Journal of the European Union*, Protocol no.4. Available: <http://www.ecb.int/ecb/legal/pdf/en_statute_from_c_11520080509en02010328.pdf> [2013-04-16]

European Union (EU) / Summaries of EU legislation / Economic and Monetary affairs / Practical aspects of introducing the euro (last updated 2011-07-19). [Electronic]. Available : <http://europa.eu/legislation_summaries/economic_and_monetary_affairs/introducing_euro_practical_aspects/l25007_en.htm> [2013-04-10]

Heinz, Frigyes Ferdinand & Rusinova, Desislava (2011). How flexible are real wages in EU countries? A panel data. [Electronic]. *Working paper series*, no. 1360. Available: <http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1360.pdf> [2013-05-13]

Henning, C. Randall (2007). Organizing Foreign Exchange Intervention in the Euro Area*. [Electronic]. *Journal of Common Market Studies*, vol. 45, no.2, pp.315-342. Available: <http://randallhenning.org/jcms_713PubshdArt.pdf> [2013-04-21]

Janssen, Ronald & Mermet, Emmanuel (2003). Transfer: European review of labor and research. [Electronic]. *Sage Publications*, 4/03, p.666-687. Available: <http://trs.sagepub.com/content/9/4/666.full.pdf> [2013-05-02]

Jappelli, Tullio & Pagano, Marco (2008). Financial market integration under EMU. [Electronic]. *Economic Papers 312*. Available: <http://ec.europa.eu/economy_finance/publications/publication12323_en.pdf> [2013-05-09]

Jaumotte, Florence (2011). *Fixing the flaws in EMU.* [Electronic]. Available: <http://www.imf.org/external/pubs/ft/fandd/2011/12/pdf/jaumotte.pdf> [2013-05-12]

Kolassa, Doris (2012). *The free movement of capital*. [Electronic]. Available: <http://www.europarl.europa.eu/ftu/pdf/en/FTU_3.2.4.pdf> [2013-05-02]

Lane, R Philip (2008). *EMU and financial integration*. [Electronic]. Available: <http://www.ecb.int/events/pdf/conferences/cbc5/Philip_Lane.pdf?78721f8abacf1a5dfbd3b6f64df95d5e> [2013-05-09]

Matthes, Jürgen (2009). *Ten Years EMU – Reality Test for the OCA Endogeneity Hypothesis, Economic Divergences and Future Challenges.* [Electronic] Intereconomics, Economic Trends, p. 114-128. DOI: 10.1007/s10272-009-0285-z.

McKinnon, Ronald (2002). Optimum currency areas and the European experience. [Electronic]. *Economics of Transition*, vol.10, p. 343-364. Available: <http://web.ebscohost.com.ezproxy.ub.gu.se/ehost/detail?vid=12&sid=54ee1706-09fd-4f3a-975d-f13276065bdb%40sessionmgr110&hid=121&bdata=JnNpdGU9ZWhvc3QtbGl2ZQ%3d%3d#db=ecn&AN=0619233> [2013-04-25]

Mongelli, P. Francesco (2008). European economy: European economic and monetary integration and the optimum currency area theory. [Electronic]. *European commission: Economic papers 302.* Available: <http://ec.europa.eu/economy_finance/publications/publication12081_en.pdf> [2013-04-12]

Mongelli, P. Francesco (2002). New views on the optimum currency area theory: what is EMU telling us? [Electronic]. *Working Paper* Nr 138. Available: <http://www.ecb.int/pub/pdf/scpwps/ecbwp138.pdf> [2013-04-13]

Mundell, A. Robert. (1961). A theory of optimum currency areas. [Electronic]. *The american economic review*, vol. 51, no.4. Available: <http://digamo.free.fr/mundell61.pdf> [2013-04-12]

Mundell, A. Robert. (1997). *Optimum Currency Areas*. [Electronic]. Columbia University. Available: <http://www.columbia.edu/~ram15/eOCATAviv4.html> [2013-04-25]

Rossi, Sergio (2006). International capital flows within a single currency area: the deflationary case of the European Monetary Union. [Electronic]. *Paper for the Tenth Berlin Conference "European Integration in Crisis"*, Berlin. Available: <http://www.boeckler.de/pdf/v_2006_10_27_rossi.pdf> [2013-05-15]

Scheller, K. Hanspeter (2004). *The European Central Bank. History, role and functions.* [Electronic]. ECB. Available: <http://www.ecb.int/pub/pdf/other/ecbhistoryrolefunctions2004en.pdf> [2013-04-14]

Sveriges Ambassad (n.d.). Landfakta / Om Grekland / Ekonomi, näringsliv, handel och investeringar. [Electronic]. Available: <http://www.swedenabroad.com/sv-SE/Ambassader/Athen/Landfakta/Om-Grekland/Ekonomi-naringsliv-handel-och-investeringar/> [2013-05-08]

Sveriges Riksbank (Last updated 2011-09-30). *How changes in the repo rate affect inflation.* [Electronic]. Available: <http://www.riksbank.se/en/Monetary-policy/Forecasts-and-interest-rate-decisions/How-changes-in-the-repo-rate-affect-inflation/> [2013-04-14]

Tavlas, S. George (1994). The theory of monetary integration. [Electronic]. *Open economies review*, vol 5, p. 211-230. Available: <http://web.ebscohost.com.ezproxy.ub.gu.se/ehost/detail?sid=54ee1706-09fd-4f3a-975d-f13276065bdb%40sessionmgr110&vid=8&hid=121> [2013-04-12]

Figures

Figure 1

Scheller (2004:83). *The stability-oriented monetary policy strategy of the ECB*

Figure 2

Sveriges Riksbank (2011). *How changes in the repo rate affect inflation.*

Figure 3

Scheller (2004:86). *Eurosystem monetary policy operations.*

Figure 4

Eurostat (Last updated 2013-04-25). *Imports of goods – total* and *exports of goods - total.* [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=teiet110&plugin=1> and <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=teiet010&plugin=1> [2013-04-28]

Figure 5

Eurostat (Last updated 2013-02-27). *Real GDP growth rate – volume.* [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&plugin=1&language=en&pcode=tec00115> [2013-04-28]

Figure 6

European Commission / Eurostat (Last updated 2012-10-22). *HICP annual average inflation rates 2001-2011*. [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:HICP_all-items,_annual_average_inflation_rates,_2001-2011_(%25).png&filetimestamp=2012102214565#filehistory> [2013-04-28]

Eurostat / Inflation dashboard (Last updated 2013-03-31). *Measuring inflation: The harmonized Index of Consumer Prices (HICP) – Annual percentage changes*. [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/inflation_dashboard/> [2013-04-28]

Inflation.eu (Last updated 2013-03-31). *Historic harmonized inflation France – HICP inflation.* [Electronic]. Available: <http://www.inflation.eu/inflation-rates/france/historic-inflation/hicp-inflation-france.aspx> [2013-04-28]

Inflation.eu (Last updated 2013-03-31). *Historic harmonised inflation Germany – HICP inflation.* [Electronic]. Available: <http://www.inflation.eu/inflation-rates/germany/historic-inflation/hicp-inflation-germany.aspx> [2013-04-28]

Inflation.eu (Last updated 2013-03-31). *Historic harmonised inflation Greece – HICP inflation*. [Electronic]. Available: <http://www.inflation.eu/inflation-rates/greece/historic-inflation/hicp-inflation-greece.aspx> [2013-04-28]

YCHARTS (Last updated 2013-03-31). *Cyprus inflation rates*. [Electronic]. Available: <http://ycharts.com/indicators/cyprus_inflation_rate> [2013-04-28]

YCHARTS (Last updated 2013-03-31). *Eurozone inflation rate.* [Electronic]. Available: <https://ycharts.com/indicators/eurozone_inflation_rate> [2013-04-28]

Figure 7

Eurostat (Last updated 2013-03-15). *HICP (2005=100) – annual data (average index and rate of change).* [Electronic]. Available: <http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=prc_hicp_aind&lang=en> [2013-04-28]

Figure 8

Eurostat (Last updated 2013-04-25). *Total unemployment rate by country.* [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tsdec450&plugin=1> [2013-04-28]

Figure 9

Eurostat (Last updated 2013-05-15). *Harmonised unemployment rate by country.* [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&language=en&pcode=teilm020&tableSelection=1&plugin=1> [2013-05-16]

Figure 10

Eurostat (Last updated 2013-04-25). *International trade, by reporting country, total product.* [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tet00002&plugin=1> [2013-04-28]

Figure 11

Eurostat (Last updated 2013-02-26). *USD/EUR.* [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/tgm/table.do?tab=table&init=1&language=en&pcode=tec00033&plugin=1> [2013-04-28]

Figure 12

European Commission / Eurostat (Last updated 2012-10-22). *HICP annual average inflation rates 2001-2011*. [Electronic]. Available: <http://epp.eurostat.ec.europa.eu/statistics_explained/index.php?title=File:HICP_all-items,_annual_average_inflation_rates,_2001-2011_(%25).png&filetimestamp=2012102214565#filehistory> [2013-05-14]

Figure 13

Krugman et al (2012:601). *Deciding when to peg the exchange rate.*

Appendix

Appendix 1: Inflation rates in the EZ

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Austria (Joined 1999-01-01)	2,3%	1,7%	1,3%	2,0%	2,1%	1,7%	2,2%	3,2%	4,0%	1,7%	3,6%
Belgium(Joined 1999-01-01)	2,4%	1,6%	1,5%	1,9%	2,5%	2,3%	1,8%	4,5%	0,0%	2,3%	3,5%
Cyprus (Joined 2008-01-01)	2,0%	2,8%	4,0%	1,9%	2,0%	2,2%	2,2%	4,4%	2,0%	2,6%	3,5%
Estonia (Joined 2011-01-01)	5,6%	3,6%	1,4%	3,0%	4,1%	4,4%	6,7%	10,6%	2,0%	2,7%	5,1%
Finland (Joined 1999-01-01)	2,7%	2,0%	1,3%	1,0%	8,0%	1,3%	1,6%	3,9%	1,6%	1,7%	3,3%
France (Joined 1999-01-01)	1,8%	1,9%	2,2%	2,3%	1,9%	1,9%	1,6%	3,2%	1,0%	1,7%	2,3%
Germany (Joined 1999-01-01)	1,9%	1,4%	1,0%	1,8%	1,9%	1,8%	2,3%	2,8%	0,2%	1,2%	2,5%
Greece (Joined 2001-01-01)	3,7%	3,9%	3,4%	3,0%	3,5%	3,3%	3,0%	4,2%	1,3%	4,7%	3,1%
Ireland (Joined 1999-01-01)	4,0%	4,7%	4,0%	2,3%	2,2%	2,7%	2,9%	3,1%	-1,7%	-1,6%	1,2%
Italy (Joined 1999-01-01)	2,3%	2,6%	2,8%	2,3%	2,2%	2,2%	2,0%	3,5%	0,8%	1,6%	2,9%
Luxembourg (Joined 1999-01-01)	2,4%	2,1%	2,5%	3,2%	3,8%	3,0%	2,7%	4,1%	0,0%	2,8%	3,7%
Malta (Joined 2008-01-01)	2,5%	2,6%	1,9%	2,7%	2,5%	2,6%	0,7%	4,7%	1,8%	2,0%	2,5%
Netherlands (Joined 1999-01-01)	5,1%	3,9%	2,2%	1,4%	1,5%	1,7%	1,6%	2,2%	1,0%	0,9%	2,5%
Portugal (Joined 1999-01-01)	4,4%	3,7%	3,3%	2,5%	2,1%	3,0%	2,4%	2,7%	-0,9%	1,4%	3,6%
Slovakia (Joined 2009-01-01)	7,2%	3,5%	8,4%	7,5%	2,8%	4,3%	1,9%	3,9%	0,9%	0,7%	4,1%
Slovenia (Joined 2007-01-01)	8,6%	7,5%	5,7%	3,7%	2,5%	2,5%	3,8%	5,5%	0,9%	2,1%	2,1%
Spain (Jonied 1999-01-01)	2,8%	3,6%	3,1%	3,1%	3,4%	3,6%	2,8%	4,1%	-0,2%	2,0%	3,1%
Annual average inflation rate EZ	2,98%	2,76%	2,41%	2,23%	2,93%	2,38%	2,36%	3,74%	0,79%	1,74%	3,09%

Figure 12. *HICP annual average inflation rates, 2001-2011* (Last updated 2012-10-22).

Appendix 2: The GG-LL model

The GG-LL model is a model based upon the decision whether to join a currency area with a fixed exchange rate or not. The purpose of the model is to compare the differences between the benefits and costs of joining a currency area and find out whether the gains of joining exceeds the costs. The benefits are measured as the monetary efficiency gain and the costs as the loss of economic stability.

The upward sloping GG-curve shows that the country's commercial relation to the currency area is crucial for the potential gain. In other words, it shows the relationship between the gain of monetary efficiency and the economic integration. As the economic integration increases between the country and the currency area, the gain of monetary efficiency rises, as illustrated by Figure 13.

The benefit when joining the fixed exchange rate area, i.e. the gain of monetary efficiency, consists of what the joining country will save in terms of avoiding uncertainty, confusion, transaction and calculation costs that will arise when having a floating exchange rate. In reality this can be quite diffuse to calculate (Krugman et al. 2012:596-598).

To summarize and to quote Krugman et al. (2012:597) “a high degree of economic integration between a country and a fixed exchange rate area magnifies the monetary efficiency gain the country reaps when it fixes its exchange rate against the areas currencies. The more extensive are cross-border trade and factor movements, the greater is the gain from a fixed cross-border exchange rate”.

The downward-sloping LL-curve describes the loss of economic stability (costs that arise due to the fact that member countries give up their ability to affect output and employment with monetary policy and the exchange rate) and it is also related to the economic integration that the country have towards the fixed exchange rate area. The loss of economic stability is defined as the additional instability caused by the fixed exchange rate. As illustrated by Figure 13, the more economic integrated the country is with the area, the lower will the loss of economic stability be.

To again summarize and quote Krugman et al. (2012:600) “a high degree of economic integration between a country and the fixed exchange rate area that it joins reduces the resulting economic stability loss due to output market disturbances”.

When combining the GG and LL curve one can consider whether it is profitable for a country to join a currency area or not. If the degree of economic integration is at point 1 or above between the joining country and the currency area, it implies that the country should join the area. In this scenario the loss of economic stability is lower than the gain of monetary efficiency which results in a net gain for the country. On the contrary, when the degree of integration is lower than point 1 the country would suffer from instability in output and employment and would do better off without joining (Krugman et al., 2012:600-601).

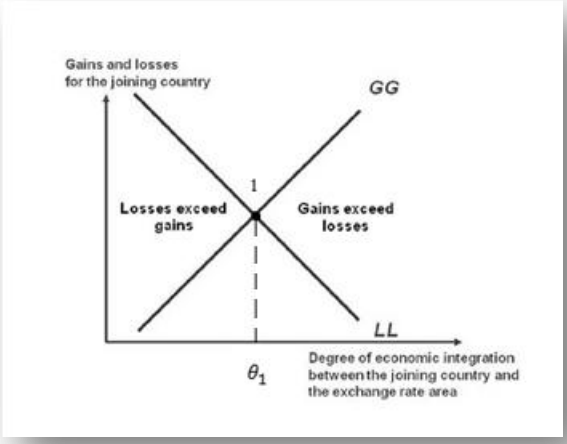

Figure 13. Krugman et al. (2012:601) *Deciding when to peg the exchange rate.*